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# *Post War Planning Now—And How*

WITH the exception of certain types of aircraft that provide their own transportation and of a certain volume of expendable ammunition, one is pretty safe in saying that it takes an average of nearly six months to move war materiel from our American factories to the European battle fronts. This takes into account the necessary delays as well as the unnecessary ones in connection with shipping to American depots, from these to seaboard, loading, trans-Atlantic shipping, unloading, storage at intermediate points, unloading, transporting to behind-the-line or other depots and finally loading and shipping to battle areas.

Nine out of ten authorities tell us that it is fairly certain that the war in Europe will end in not more than six months. Putting two and two together this means that practically all of the war materiel needed to win the war in this theater is already made and is now outside of our factory gates. Indications that this is true lie in the lessening of demand for steel and other raw materials for war purposes.

Authorities also tell us that the winning of the war in Europe will relieve our American industrial economy of approximately two-thirds of its present applied effort. Which in turn means that within six months from now, approximately two-thirds of those presently employed on war work will be looking for jobs making peacetime products.

Who is going to put and keep these people at work?

If government attempts to do it as a direct employer it will run up against two unsurmountable obstacles. One is that government does not have salable peacetime products to make whereby people can be given jobs on the broad scale necessary. The other is that the great majority of the people of this country is not willing to be forced into state socialism, which is what such government employment and competition with private enterprise would mean.

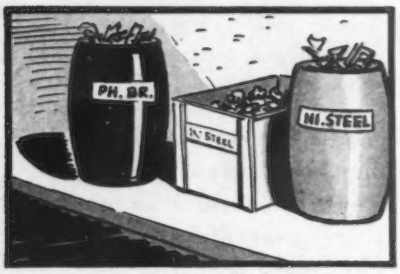
Private industry has plenty of promising peacetime products, many of them new and spectacular with which to create employment in a new and better America. But it lacks one very necessary thing, namely assurance that government through procrastination is not going to force private business into bankruptcy during the changeover period.

Most of our industrial concerns, even including our large ones, do not have enough surplus, thanks to taxation and renegotiation, to carry them more than 90 days, should war end tomorrow. If government waits until the war ends to formulate and make clear its policies with respect to reconversion, contract termination and surplus commodity disposal, the chances are that the chief private employment will be for watchmen looking after closed plants.

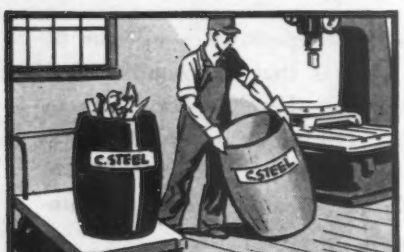
# It Is Still *Important*

## To Save and Segregate Critical Alloys

*Segregate alloy scrap at the machines where it is made.*




*Label containers with metal grade names or numbers.*




*Always have at hand empty containers, properly labeled.*

*Keep alloy scrap segregated in the yard while waiting shipment to steel mills.*

Tons of critical alloys can be saved for urgently needed weapons of war and tools if every shop working with alloy steels and different metals will adopt the simple practices pictured at the left.

Equipment need not be elaborate—only a few barrels or boxes properly labeled. Then spend a little time with workmen explaining the need for alloy scrap segregation and how you want them to do it. Finally check up occasionally to make certain that the plan is being followed and that new men know what you are trying to accomplish.

America is a "have not" nation in respect to many critical alloys. That is why it is *still important* to segregate scrap and ship it to steel mills where alloys can be reclaimed.

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The IRON AGE
DEC. 2, 1943

# NEWS FRONT

• CIO men on WPB are taking leaves-of-absence until March, to devote all their energies to the rapidly developing battle for wage increases in the steel industry. Indications are that it may be quite a tussle.

• Initial demand will likely be 25c an hr. with a retreat to 15c an hr. as bargaining progresses.

• Steel output continues to overbalance war demands, with the industry's largest user, the Maritime Commission, likely to initiate program cut-backs by the first of the year.

• The recent WPB ruling forcing certain alloy steels into electric furnaces to release open hearth capacity for carbon steels will this week likely be eased or rescinded. Open hearths are now available to take the carbon load; furthermore, the order worked a distinct hardship on some producers having no electric capacity.

• The huge Geneva mills, steel works in Texas, and other additional capacity scattered throughout the country likely will be completed, despite recent easing in the supply situation. Regional political pressures forcing completion are of an intensity to discourage any alteration in plans; moreover, Jesse Jones will likely prefer a complete mill to put on the block rather than almost-completed units.

• And: As steel production eases regional political pressures mount to protect operations in each area.

• Mr. Hull's State Department has grown from 816 employees in World War I to some 3000 in World War II, with about 4640 additional temporary wartime appointees. The Department has just released two volumes on U. S. participation in the 1919 Paris Peace Conference--20 more volumes are scheduled for the future.

• Lend-Lease accounted for 60.7 percent of export trade last year; currently it is 81 percent. A billion dollars a month business is done with a staff of 650.

• Ford will spin about 200 tons of steel a day in a new Ontario foundry. By placing cores at the mold entry, hot metal erosion is minimized thereby increasing mold life and eliminating need for alloy molds. Mold life is well over 5000 pieces, and metal yield runs as high as 91 percent.

• The 200-ton a day electric furnace of the Oregon Electric Steel Rolling Mills, only mill at Portland, Ore., is up for sale at a bargain price with no buyers in prospect. This installation operates entirely on scrap in a cheap scrap area.

• Surplus inventory in the Pacific Southwest region due to contract cancellation or termination is set at 75,000 to 100,000 tons of steel.

• 4000 tons of surplus hot rolled strip stock 3/16 gage from 7/8 to 1½ in. wide and up to 30 ft. long, left after steel landing strip program was abruptly terminated, has been taken by South America after being turned down in this country.

• General Motors is now placing machine tool orders for its reconversion requirements. Orders amounting to 10 times its usual yearly requirements for annual model changes indicate the company's small hope to reconvert its present machinery.

• Reconversion to civilian production should start with the small manufacturers then to be taken up by the larger corporations, Smaller War Plants Corp. says.

• Liquid cooled engines will be produced in Australia beginning with the production and maintenance of spares.

• German propagandists again have started talking about a new secret super-bomb, to be used for retaliation against the British. Designed by Hitler's friend, the Bavarian Colonel Dumplinger, the bomb contains a new powerful explosive (well known to Allied chemists), and a very sensitive fuse from which the so-called Dinort Stab (Dinort stick) projects to secure above-ground explosion. The Dinort stick was developed by the well-known German sailplane and Stuka pilot several years ago, and is not as feared by the Allies as the parachute bomb.

• For the first time in five months, the West Coast aircraft industry is now on schedule. In the first eight months of this year production increased 41.4 per cent by weight, while employment increased only 5.8 per cent. Labor turnover remains the biggest problem.

# Casting Spinning Practice

***. . . Centrifugal casting, slowly laboring to the status of a full blown art, is one of the outstanding developments of the war technology. The practice of Ford Motor Co. of Canada, where some remarkable work in developing spinning on a substantial production basis is being done, is described herein.***

THE story of the development of centrifugal casting at the Windsor, Ont., plant of Ford Motor Co. of Canada, Ltd., is the story of breaking bottlenecks in the production of motive equipment in the dark days of 1942, a story of fighting to relieve over-crowded screw machines and forging presses, to ease material shortages. And like many a war production report, the expediencies adopted to break these bottlenecks have developed into production techniques in their own right and have earned a permanent place in this motor plant as vital units in the production of war equipment.

It is equally true that under the spur of the urgency of war the technology of centrifugal casting has moved forward by leaps. Castings being produced now in volume were only the ephemeral goals of yesterday.

A particularly interesting feature of this Ford plant is the fact that the spinning departments have been designed from the floor up with the sole purpose of providing efficient auxiliaries to the spinning line, rather than simply adopting the spinning operations to equipment and facilities at hand.

Currently in the throes of another expansion program, this Canadian plant will turn out some 450 tons of steel castings a day when the expansion is completed. About 175 tons will be spun castings.

The centrifugal casting activities here center around three spinning units. The general layout of the major spinning area is shown in the sketch in Fig. 1. This section comprises two spinning units, one for producing knuckle tower castings (see Fig. 4) in vertical permanent molds mounted on a turntable; and another unit not shown on sketch for casting various parts in vertical core molds.

The unit at A, Fig. 1, the turntable unit, is shown in greater detail in Fig. 2. Fig. 3 shows the molds used on this table to produce the knuckles shown in Fig. 4. The right hand mold section in Fig. 3 shows the cores in place and provides an excellent illustration of one of the factors to which Ford foundrymen attribute their success in keeping mold cost low. This factor is the splash core shown at B, Fig. 3.

Mold cost is always an important factor in centrifugal casting costs.

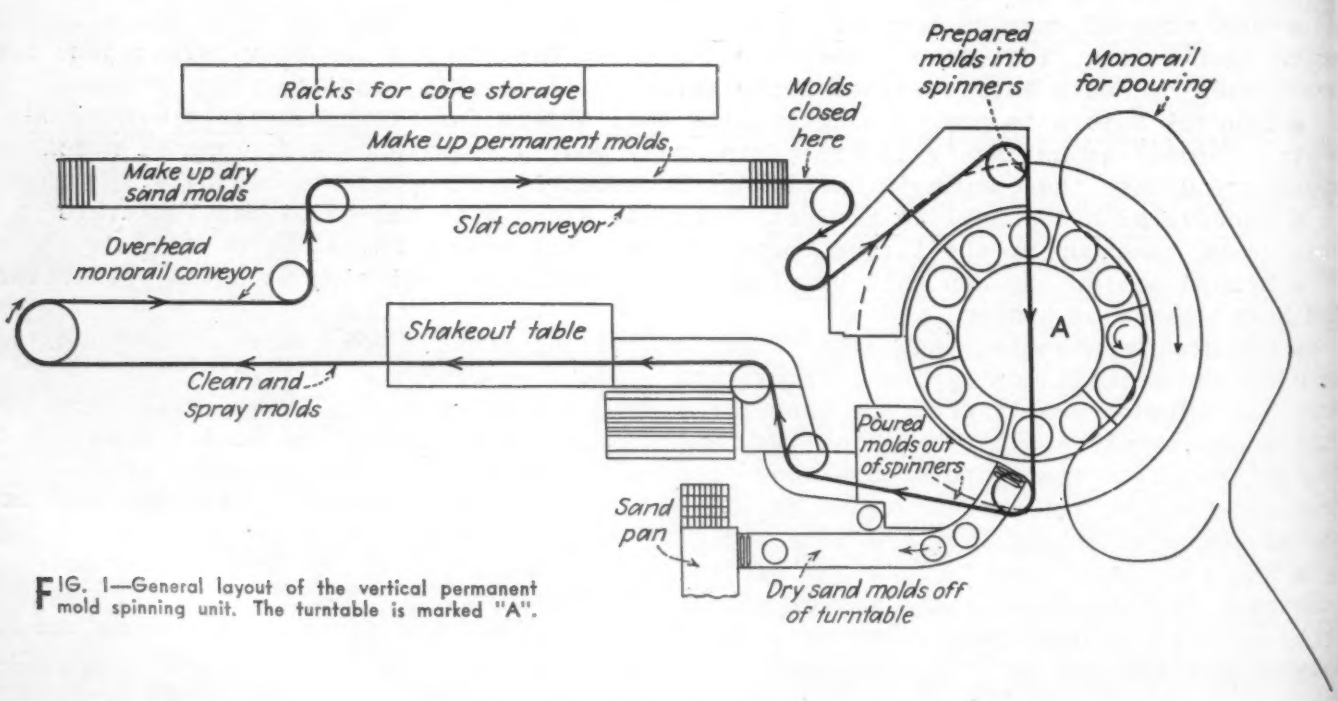
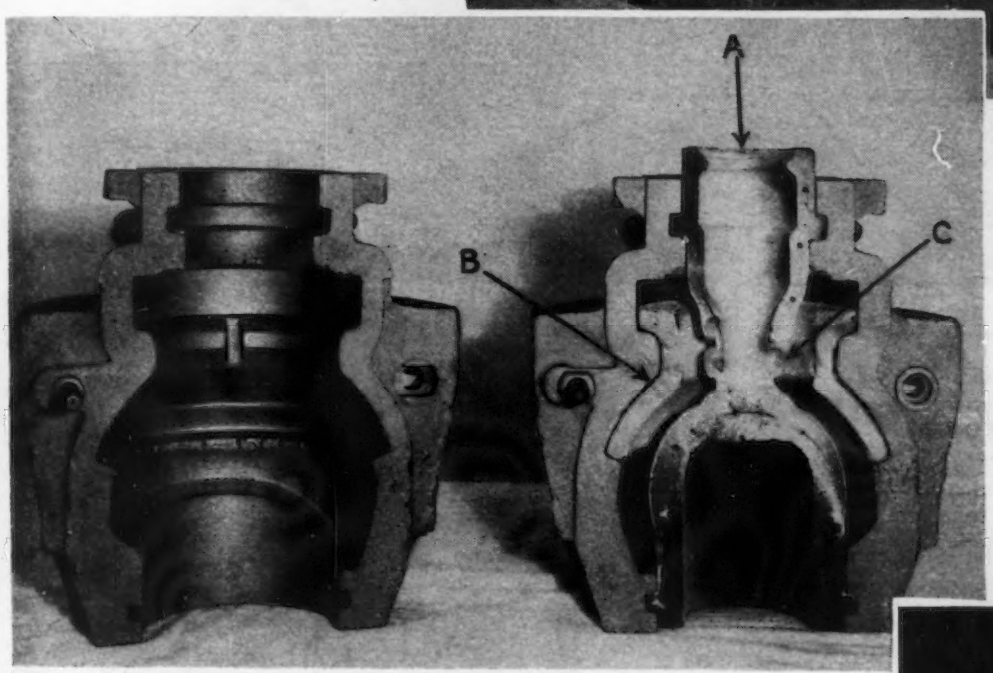



FIG. 1—General layout of the vertical permanent mold spinning unit. The turntable is marked "A".

Some spinning plants have turned to the use of alloy material to induce longer life in permanent molds. The chief point of wear in a centrifugal permanent mold is the point where the steel (or metal) first strikes the mold when entering the mold cavity. Thus the use of alloy metal throughout the mold appears to be solving the problem the hard way.

At the Ford plant the practice is to use splash cores, that is cores placed at the point where the steel enters the mold, thus protecting the mold metal from the eroding effect of the hot metal. This practice in turn eliminates the need of expensive metal for the mold proper. The iron used in the




ABOVE

FIG. 2—Closeup of turntable spinning unit marked "A" in Fig. 1.

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LEFT

FIG. 3—Molds used on turntable unit shown in Fig. 2. Mold on right shows cores in place. A is the main core, B the splash core and C the gate in the main core.

o o o

BELOW

FIG. 4—Knuckle joint castings spun in the molds shown in Fig. 3.

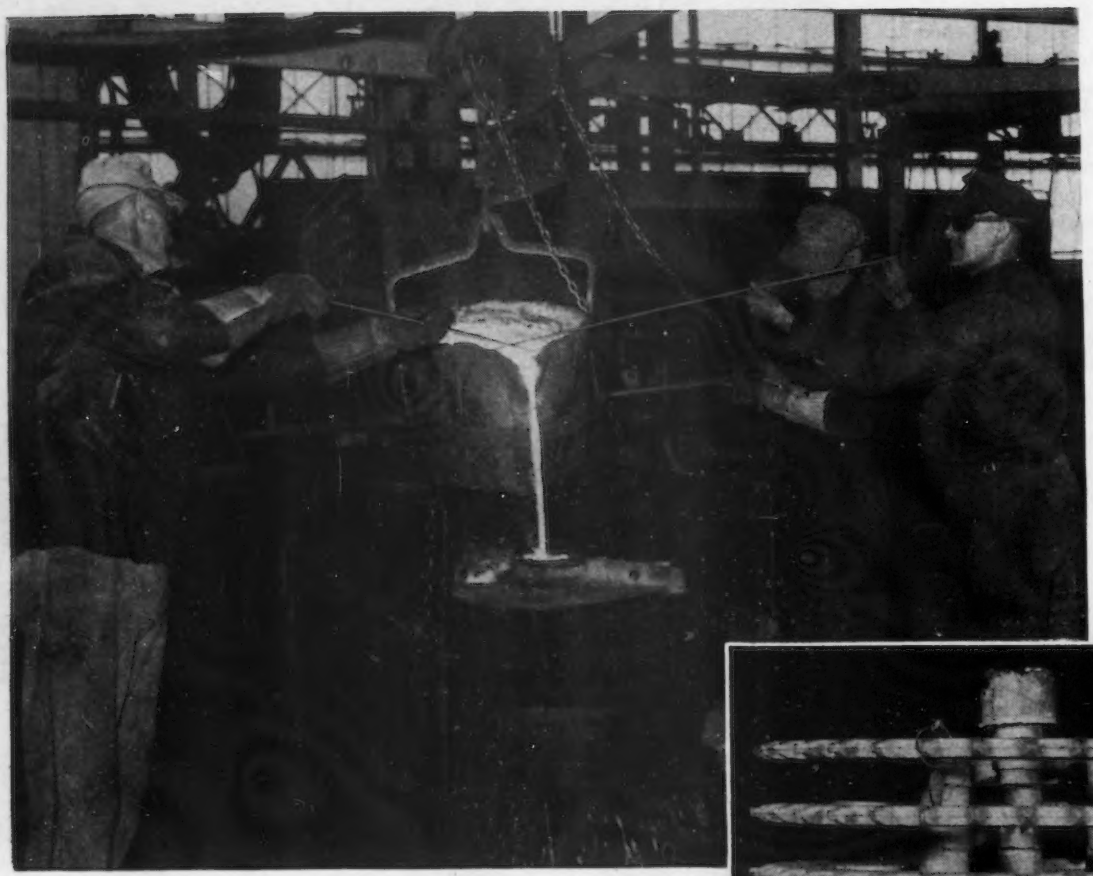
permanent molds at Ford runs C 3.2; Si 2.10; Mn 0.85; S 0.1 and P 0.1 max. Molds of the type shown in Fig. 3 have run 5000 pieces and still do not show any signs of deterioration.

The cores for the knuckle joint (Fig. 3) are in two half sections, with ribs being used to locate the cores in their proper position. The core marked A is the main core, while B is the splash core. The gate in the main core is at C. Thus the steel is poured down the center of the main gate, runs through the gate at C, strikes the splash core B, and then flows to the mold proper.

The turntable machine shown in Fig. 2, which produces the knuckle joints, consists of 12 stations or mold holders. As the mold revolves about its own axis at 170 r.p.m., it also progresses from right to left with the turntable at a peripheral speed of about 1250 ft. per min based on the 14-in. diam. of the mold. This turntable speed permits the production of 100 molds an hour from this table.

The two-part permanent mold used for this casting is made up along a conveyor, shown at top center in Fig. 1. This make up consists of spraying the mold interior with a silica wash, inserting the cores, joining the two mold sections and being picked up by the overhead conveyor.

The silica wash used here is made up of 30 gal. of cold water, 200 lb. of silica flour, 4 qt. of Glutrin, and 8 gal. of Bentonite paste. This Bentonite paste is prepared by mixing 14 qt. Bentonite powder and 30 gal. of water at 180 deg. F. The wash is used more



o o o

LEFT

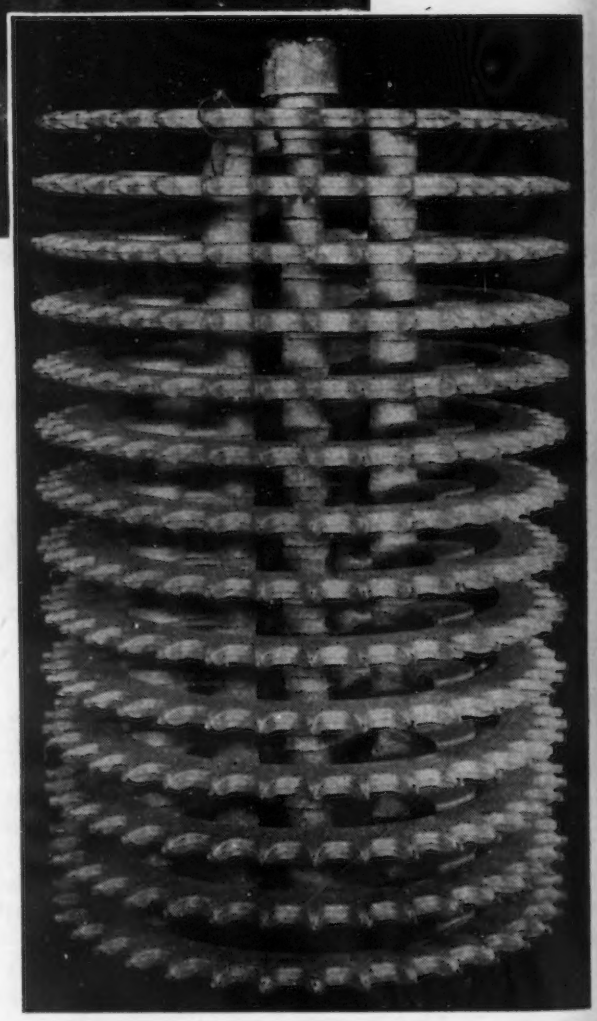
FIG. 5—Pouring a vertical dry sand mold of the type shown in Fig. 8.

o o o

to enhance the casting finish than to prevent sticking. The lift device used to move the molds on and off the table is equipped with a catch arrangement which, when engaged, keeps the mold sections in close contact, but when released permits the mold sections to swing apart.

As the molds are placed on the turntable and move into the pouring area, they actuate a limit switch which causes them to spin counter-clockwise. The molds are poured from handshanks on a monorail carrier, the poured advancing with the turntable. Note the spring shock absorbing device incorporated into the shank lift.

These molds are poured "gently." No effort is made to force the pouring. Since the gate is of rather generous area, the steel is taken rather rapidly. After pouring, the mold continues to revolve for 3 min. It is then held for another 2 min. on the turntable before shaking out.



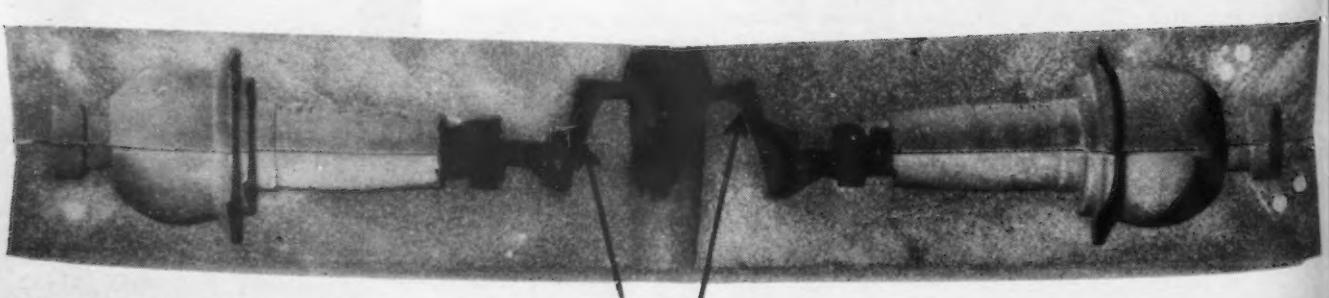
RIGHT

FIG. 6—Bren carrier sprockets produced in a single mold on the spinner shown in Fig. 5.

o o o

BELOW

FIG. 7—Cross section of a dry sand mold for vertical spinning. Darkened area is the gate section.



The pouring section of the turntable is backed with an asbestos shield to protect the men who work on the platform in the center of the table to aid in placing the molds in the spinners and hooking slings to remove the molds from the table.

The shakeout and cooling of the molds is accomplished on a conveyor. A study of the sketch on Fig. 1 shows the route of the molds through the pouring and subsequent cycles.

The knuckle towers (Fig. 4) cast on this unit weigh 36 lb., as cast, including the sprue. The shipping weight of the part is 25 lb., giving a yield of 70 per cent. When these parts were statically cast, the yield was 33 per cent. The foundry loss on this spun casting runs about 2 per cent, while the overall loss, including machine shop rejects, is put at an average of 5 per cent.

Chief losses with this casting arise from core blows and core shifts. These knuckle towers are poured of an iron running C 0.4 to 0.45; Mn 0.7 to 0.9; Si 0.3 max.; S 0.05 and P 0.05 max.

The second spinning unit at this plant is shown in Fig. 5 and is what might be called a jobbing unit. It consists of eight vertical tables, each capable of being independently operated. These tables are equipped with various sizes of adapters which permit spinning flasks from 12 to 23 in. in diameter. Speeds and temperatures used with these spinners are the same as those used with the turntable unit.

Typical of the work spun on these units are the sprockets shown in Fig. 6. These sprockets (13 to a mold) weigh 21 lb. each, and are 21 in. in diameter. Yield is about 65 per cent.

An interesting aspect of the work done on these vertical units is the fact that the core for each casting is an independent unit and can be stacked one upon another as high as desired. A typical core arrangement is shown in Fig. 7. The gate area has been darkened to bring out the shape of the "umbrella gate" (arrows), a device the Ford technicians swear by.

This type of gating was developed to prevent premature entrance of steel into the mold cavity. It was found that with the usual straight, horizontal feed as the steel was poured down the main gate, centrifugal force would cause a small amount to splatter into the mold cavities of the upper cores before the steel rose to this level in the main gate. This loose steel would solidify before the body of the metal being poured reached the mold cavity, causing little islands of defects.

ABOVE

FIG. 8—Method of holding stacked dry sand molds for spinning.

o o o

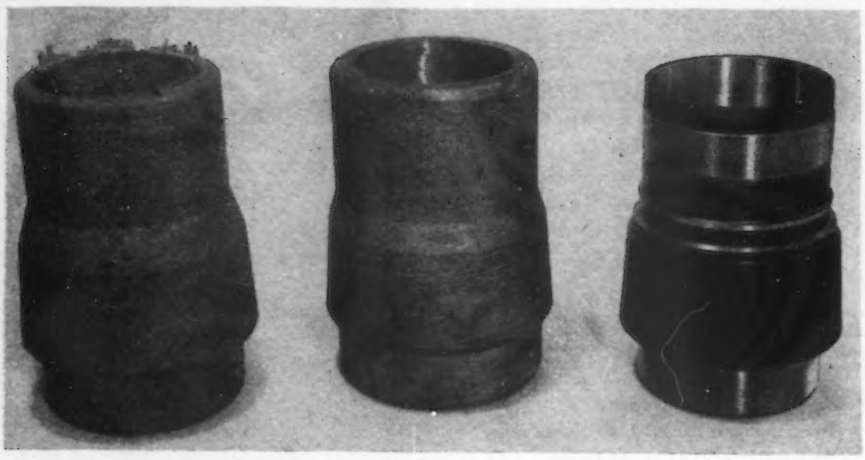
LEFT

FIG. 9—Shaking out a dry sand sprocket mold. Note extensive use of core wires for strengthening the mold.

o o o

BELOW

FIG. 10—Ejecting an aircraft cylinder spun in a horizontal permanent mold.



The cores shown in this illustration are made from the following mix: 700 lb. dry sharp sand; 300 lb. bank sand; 14 qt. Rex binder; 4 qt. core oil.

The cores, such as shown in Fig. 7 can be stacked as high as necessary. The method of holding these molds in the flask is shown in Fig. 8. When the sprockets were first cast, they were produced one at a time. Then as the design and core bugs were worked out, they were stacked one upon another until as many as 15 were cast in one cluster. However the practical limitations of lifting equipment and power available to spin the tables limits the number to be produced in one flask to 13 sprockets. Fig. 9 shows the appearance of the sprockets during shakeout. Note the heavy core wires.

The umbrella design prevents this. Should any small particles of molten metal leave the main steel stream in the center gate prematurely, it hits the walls of the gate and solidifies before reaching the mold cavity, or collects in the lower pocket ahead of the main cavity. This type of gate has worked out very well and is used whenever feasible.

Core practice when spinning appears to give best results with a hard core. The cores used in the knuckles previously illustrated, have a dry strength of 13 to 15 lb. and a permeability of 180. The strength of a core for spinning is also increased by extensive use of wiring, as Fig. 9 indicates.

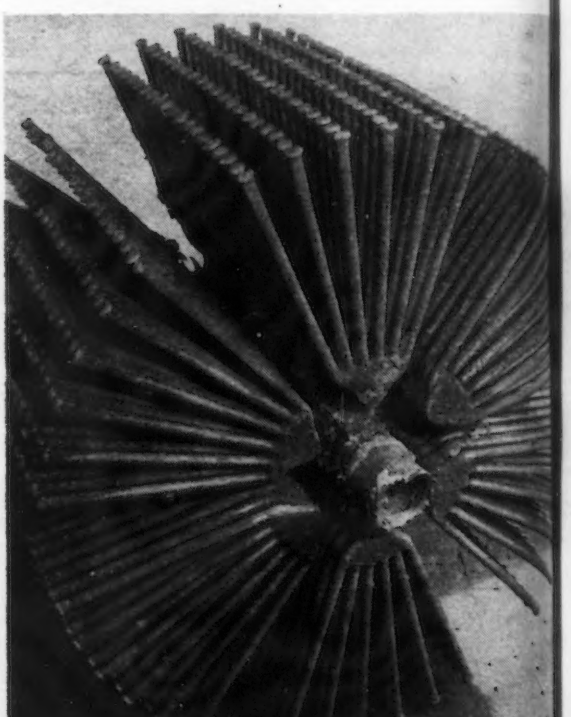
ABOVE

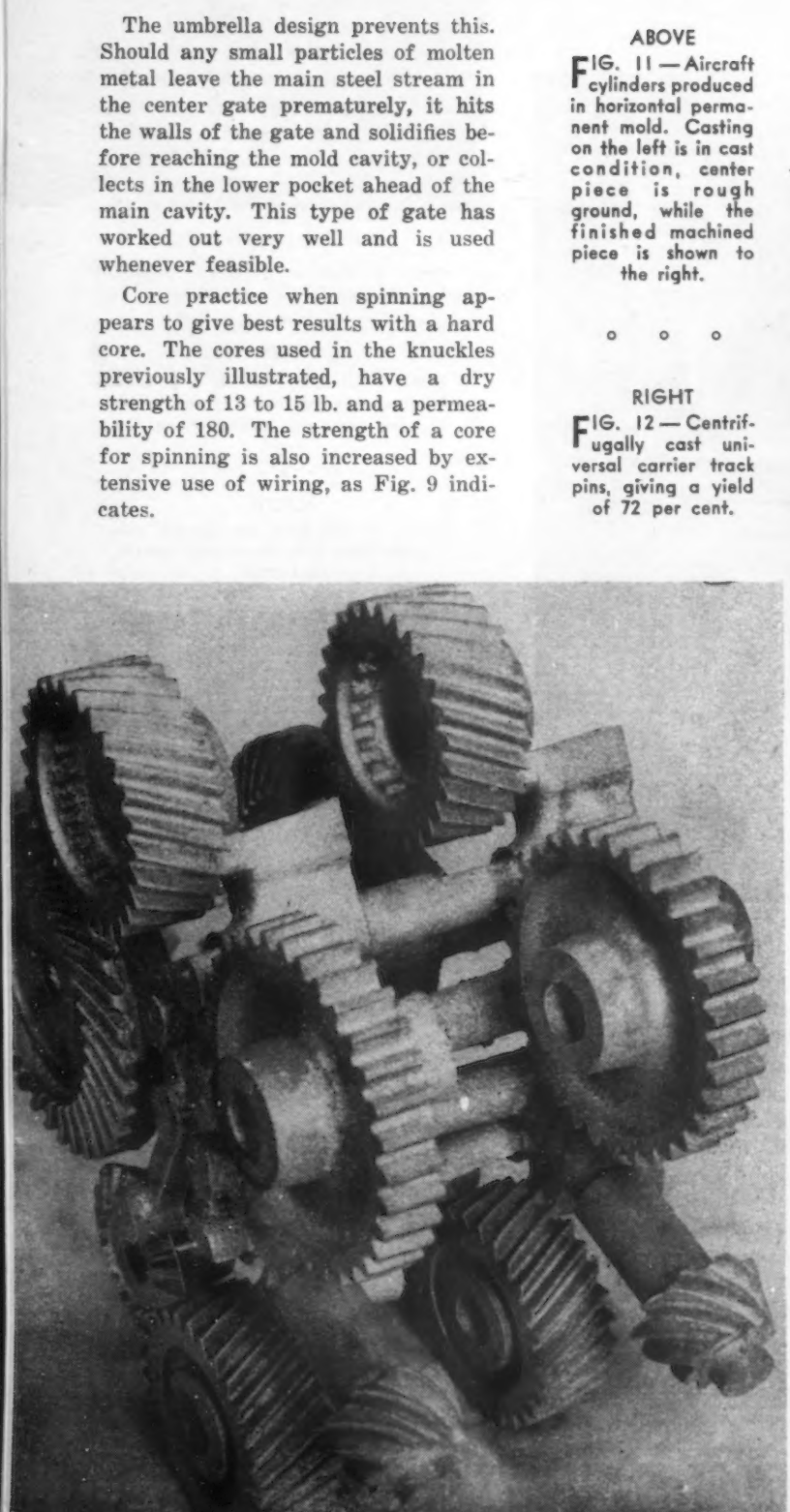
FIG. 11 — Aircraft cylinders produced in horizontal permanent mold. Casting on the left is in cast condition, center piece is rough ground, while the finished machined piece is shown to the right.

o o o

RIGHT

FIG. 12 — Centrifugally cast universal carrier track pins, giving a yield of 72 per cent.





The third spinning department in the Ford Canadian plant consists of three vertical and two horizontal permanent mold units for casting aircraft engine cylinders. Fig. 10 shows a spun cylinder being ejected from the mold. These cylinders are shown in Fig. 11 in the as cast form (to the left), the clean and ground form and finally in the finished form.

This cylinder, which is spun at 1200

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LEFT

FIG. 13—an experiment cluster of gears spun in a dry sand core.

r.p.m., weighs 50 lb. in the as cast condition, and 6½ lb. finished. No die coating is used in spinning these castings, since the use of such a coating will on occasion result in inclusions which can cause reject of the finished piece on the Magnaflux test.

This casting was originally a forging. Difficulty in obtaining sufficient quantity as a forging forced the designers to turn to other means of production. The success of spinning this casting speaks well for the future of centrifugal casting.

This brief discussion of the spinning departments at the Ford plant obviously does not show the tremendous amount of study and experimentation that went into the development of these successful practices. Mr. P. Blackwood, the foundry superintendent, has evolved very definite opinions on certain phases of spinning practices. For example, he believes that the most important consideration in producing good spun castings is the relationship between mold speed and steel temperature. Experiments have indicated conclusively that this is a particularly critical relationship. He believes that the molds should be poured gently, not forced.

The knuckles, shown in Fig. 4, are poured at 2850 deg. F., with the steel kept as close to this point as is practically possible. The spinning speed is 170 r.p.m. A change in either the spinning speed or the temperature would require a change in the other factor. A lower temperature, for example, would call for a higher speed, and vice versa. Blackwood prefers to pour at the lowest possible temperature, a level usually determined as the point below which sculling results. All molds and gates here are gated and spun counter-clockwise.

Accurate weighing of the steel being poured into the mold is another important factor, particularly from the cost viewpoint. The ideal arrangement, according to Blackwood, is to finish a mold with all casting cavities full but the sprue cavity empty. Under ideal conditions, with experienced labor, this can be accomplished, he asserts. It has, he claims, been done many times at this plant.

Fig. 12 and 13 are included to show the wide variety of designs and sizes which have been spun experimentally at the Ford plant. Especially interesting are the examples of unsymetrical arrangements. Fig. 12 is a mold of track pins used in Bren gun carriers. The pins, spun in a dry sand core, weigh 0.73 lb. each, as cast, and 0.5 lb. after machining, giving a yield of 72 per cent. There are 1008 pins in this experimental mold. Note that the gating on this mold is down to the bottom of the mold, then up to each tree.

Fig. 12 is a cluster of gears cast experimentally in a dry sand mold. The results of this experiment are believed to hold considerable promise for this type of work.

Fig. 13 shows a mold of brake shoes which are subjected to heat treatment. The yield here is 60 per cent.

Fig. 14 shows a towing clevis bracket to the left and a steering knuckle flange on the right. The towing clevis brackets weigh 3 lb. each, with 92 pieces to a mold. The mold weight, including the sprue, is 308 lb. Yield on these pieces is 91 per cent. The casting on the right is a steering knuckle flange, with a yield of 92 per cent.

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RIGHT

**FIG. 15—Clusters of towing clevis bracket (left) and a steering knuckle flange, which gave, respectively, yields of 91 and 92 per cent.**

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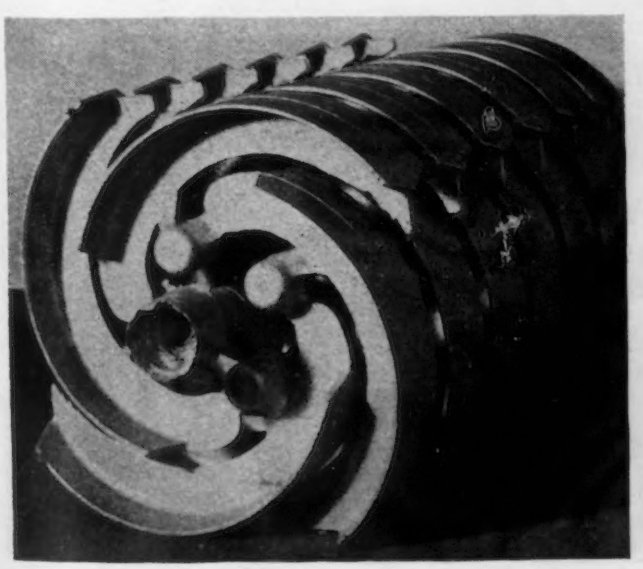
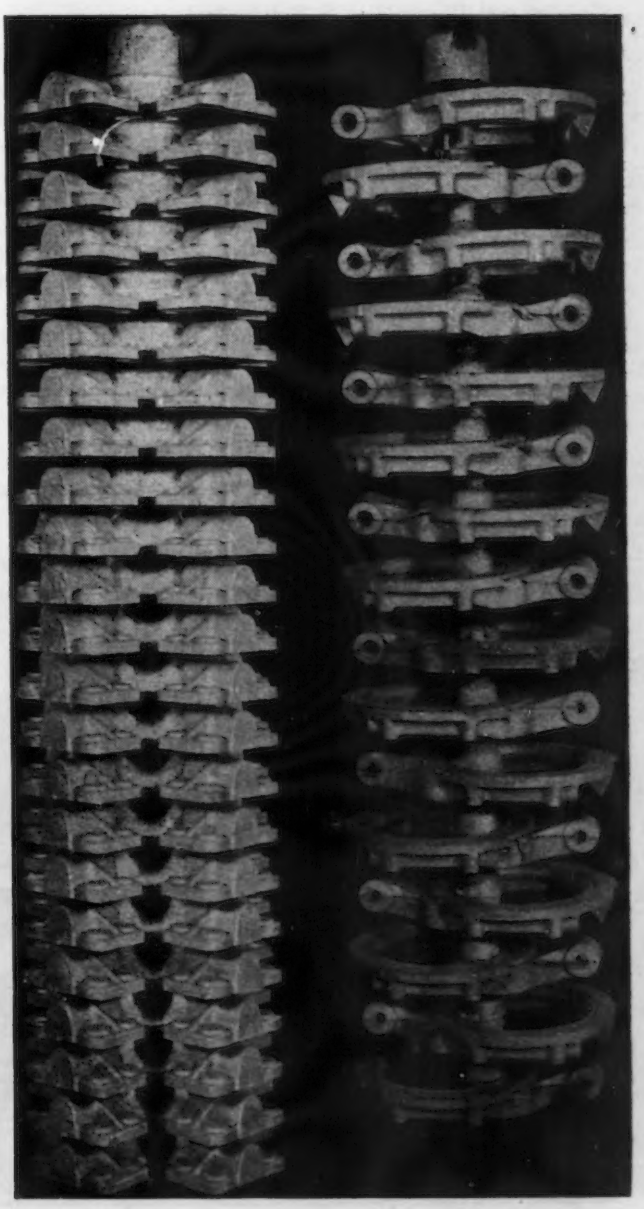
BELOW

**FIG. 14—Mold of brake shoes which gave a yield of 60 per cent.**





# *Manufacturing 105 mm.*

# High Explosive Shell

***. . . In the second part of a series on shell production operations of Mullins Mfg. Corp., the manufacture of the 105 mm. high explosive shell is described. Manufacturing operations are completed from cutting bar stocks to shell lengths, to packing for shipment to shell loading plants. The first article dealt with drawing of steel shell cases.***

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By THOMAS E. LLOYD
*Cleveland Editor,* THE IRON AGE

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COUPLED with the manufacture of steel shell cases for 105 mm. ammunition, the Mullins Mfg. Corp. and its Youngstown Pressed Steel division also forges and machines the 105 mm. high explosive projectile. As far as is known, this is the only instance where steel cases and projectiles are made by one company.

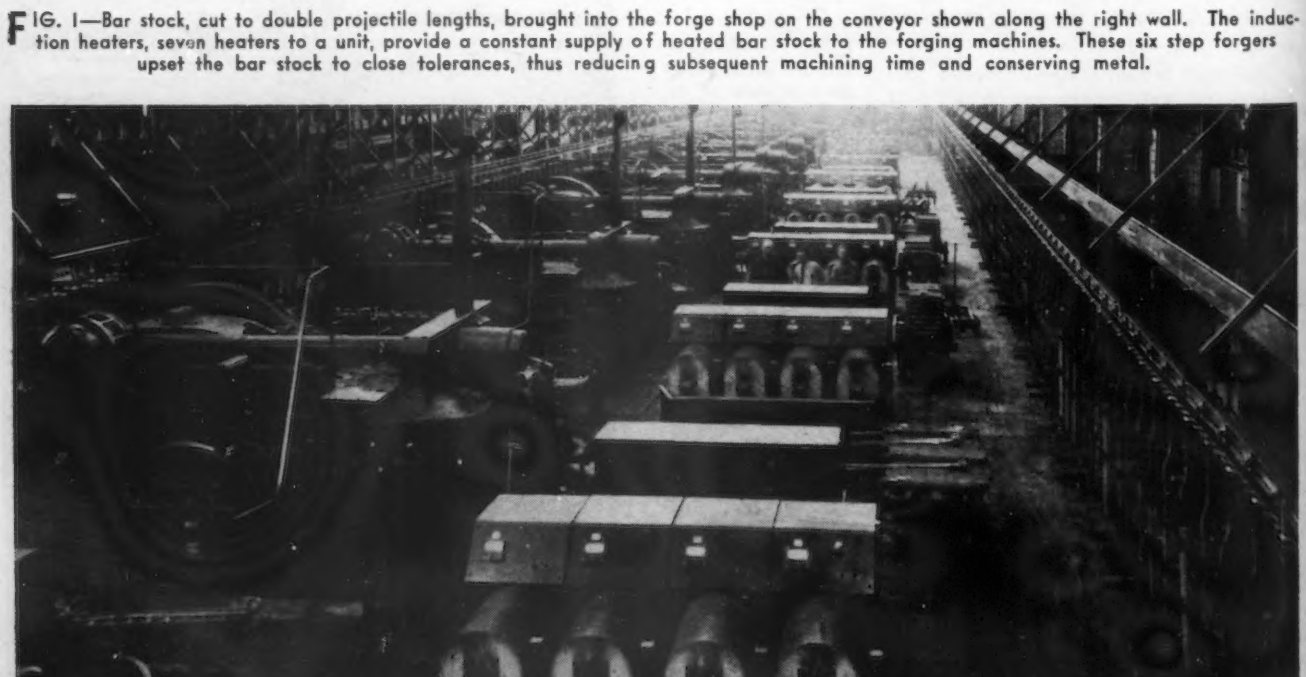
Prior to last November, Mullins purchased the finished forgings for the projectile and then did the machining and finishing, but equipment was set up for complete forging and machining operations. Raw material is purchased in the form of bar stock, in 18-ft. lengths, and then torch cut into double shell lengths. These double lengths are then transferred by a specially designed conveyor to the forge shop, shown at right in Fig. 1.

Taken from the conveyor, one end of the double length bar stock is heated in induction heating furnaces, of which there are eight units of seven heaters to each of the eight National Machinery Co. 6-in. upsetters. The heating units quickly bring the bar stock to forging temperature, from which they are transferred to the upsetter, passing through a six-stage forging operation.

This induction heating installation is reported by the builder, Ajax Electrothermic Corp., to be the largest such installation in the United States. It consists of eight 400-volt motor-generator sets each of 700 kw. rating, delivering 960 cycles at 400 volt input. The generators are driven by synchronous motors of 1000-hp., each with a 100 per cent power factor. Switchgear is of the metal blade type, with an interrupting capacity 100,000 kva.

Each generator supplies power to seven bar heaters in which 19-in. of 3-in. diameter bar stock can be heated uniformly in 4 min. This approximates an output of one hot bar every

FIG. 1—Bar stock, cut to double projectile lengths, brought into the forge shop on the conveyor shown along the right wall. The induction heaters, seven heaters to a unit, provide a constant supply of heated bar stock to the forging machines. These six step forgers upset the bar stock to close tolerances, thus reducing subsequent machining time and conserving metal.



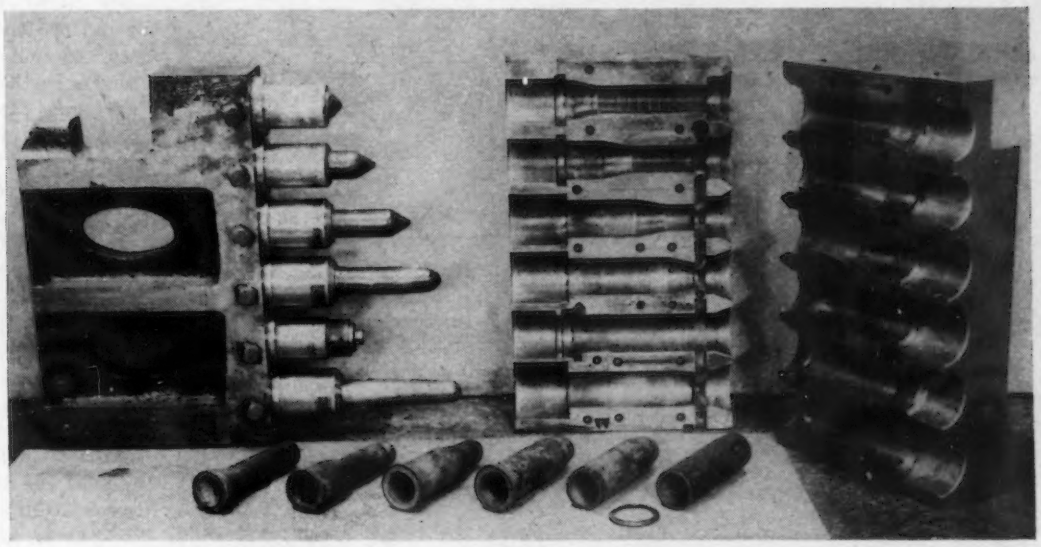


FIG. 2—Shown here are the punches and dies used in the forging machine, as well as the shape of the bar stock following each pass. Special steel inserts are used in the dies of the upsetter to insure longer die life and better forge finish.

3.43 sec. The heaters each draw an average of 100 kw. from the line, and each is governed by a timer control which, at the end of the 4-min. heating cycle, turns off the power and signals the operator. Inherent advantages in the use of this method of heating the forging stock are: (1) Lack of scale permitting longer forge punch and die life. (2) uniformity of heating, which means improvement in concentricity of forgings, (3) ability to work to closer tolerances in forging, saving steel and machining time, (4) lower power costs because heat is induced within the metal, and (5) better working conditions on the production line because of the absence of reflected and radiated heat.

The first stage forms the initial indentation in the end of the bar stock, which is given two strikes here, being turned slightly before the second strike to insure concentricity and uniformity of the slug. The second stage, and subsequent stages, further developed the upset to the point of the finished forging. The finished forging is broken off and the remainder of the bar goes back to the heaters for reheating to forging temperature. The forging dies and punches of this six-stage operation are shown in Fig. 2, and the finished forging is shown in Fig. 3.

## Punch Lubrication

The punches of the upsetter are automatically lubricated by a heavy oil spray that operates only when the upsetter is in an open position. Water sprays cool the dies after each strike. The dies used are special forge block inserts, machined to shape by Mullins.

As the forgings are finished, they are loaded on a roller conveyor which takes them to an unloading station. Here they are placed on an overhead conveyor which is equipped with can-like covers to permit uniform and prolonged cooling from the forging heat. By the time the conveyor transfers the forgings to the rough machining department, the forgings are cool enough to handle.

Rough machining begins with centering the forgings on the nib that remains after the forging tong hold is broken off. As the forgings move along the conveyor, four operators at four centering machines remove them from the conveyor, center them, and place them back on a roller conveyor for further machining. High speed steel centering drills are used, operators getting about 300 pieces before the drill is changed, the centering hole being from 7/16 in. to ⅝ in. This position of the centering hole is shown in Fig. 4, the purpose for which is in setting up the forging in further rough machining operations.

A rough turn, which is the heaviest machining operation from the standpoint of metal removal, follows the centering. This operation is performed on semi-automatic lathes, 11 of which are used. Here the forging is machined to length and diameter, and the tapers on either end are formed. Carbide tipped tools are used in forging the tapers and in cutting the

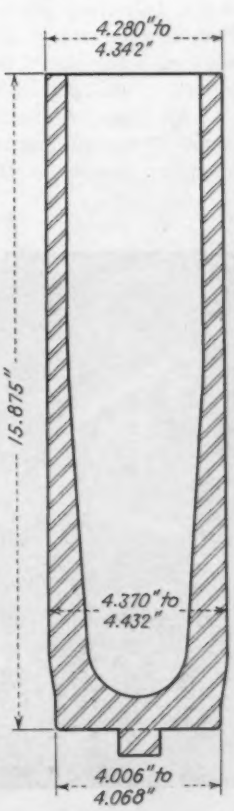
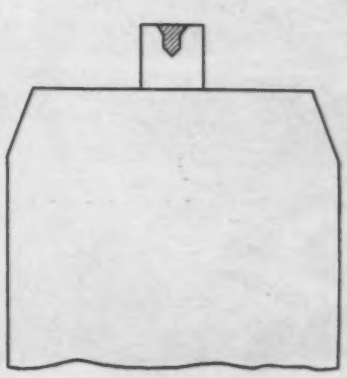



FIG. 3—The finished forging showing the close tolerances that can be achieved in upsetting bar stock. This is before any machining work is done.

FIG. 4—The nib remaining after the forg-tong hold is broken off the forging is used to center the projectile for machining operations. This nib is later machined off.



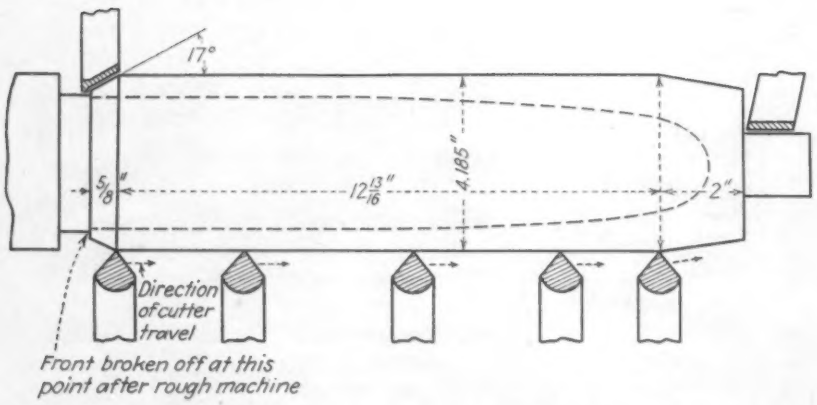



FIG. 5—The rough machining operation cuts the projectile to proper length, tapers both ends, and turns it to a true round. Carbide tipped tools are used, but because of the type of steel used the tools have to be frequently reground.

forging to length. A total of seven tools are used in this operation, four for turning the diameter, one for turning the short taper on the nose end of the shell, one for cutting it to length, and the last for forming the taper on the base end of the shell. The tooling setup of this operation is shown in Fig. 5. The quality of steel used in shell manufacture presents some difficulties in machining, so that in this rough machining operation tool changes are frequent. In machining the diameter of the forging, tools are changed after every 150 pieces, whereas the front taper, a form cut, requires a new tool after 50 cuts, the rear taper every 90 pieces, and the rear face after every 90 pieces.

## Inspection

Because of the *Quality Control* system set up by the U. S. Army Ordnance Department, where 99.5 per cent of the work must pass inspection or the entire lot is rejected, Mullins maintains inspection stations after practically every operation. Following the rough machining, each shell is inspected by the operator for length, diameter, and pitch on the tapers, and is placed on roller conveyors for delivery to the nosing press. The conveyor line and the automatics used to rough machine the forgings are shown in Fig. 6. A 1500-ton press noses the shell, forming the proper nose ogive in a cold pressing operation. A heavy lubricant is applied to the shell before it is placed in the press, thus necessitating hand cleaning following nosing.

After cleaning, a series of power driven roller conveyors takes the shell to a recirculating type gas fired, walking beam hardening furnace. This furnace, like all other gas fired furnaces in the plant, has a stand-by oil firing system, since gas pressure in the area is not too reliable. After heating, the shells drop into an oil quench tank. They are carried on the same conveyor line through the quenching tank into a walking beam draw furnace. As the conveyor brings the shell out of the oil-quench, there is a momentary pause in the line to allow adherent oil to drain back into the oil pit. An elaborately worked out fire extinguishing system is installed at the oil bath, using $CO_2$ gas piped from tank cylinders to the oil pit.

After the shells come out of the draw furnace, they pass on a gravity conveyor to an unloading station, and are unloaded and placed on an overhead conveyor with especially designed racks which take them to the finishing department, during which traveling time they cool. The shells are then internally shot blasted, four at a time, in a shot-blasting machine, after which they are given an automatic Brinell hardness test. Hardness of the shell wall must range between 40 and 42. Also, an inspection for inside finish is required at this point.

The inside nose diameters are then turned and the shell ends faced. A bank of eight lathes handles these machining operations, which are followed by inspection of the nose end and gaging. The outside finish of the shell is then turned on an eight-spindle vertical lathe, two of which are used, shown in Fig. 7. The shells are chucked and loaded into the machine by one man and unloaded by another. This vertical lathe operates much on the order of a profile cutter, performing the finish machining by following a pre-set course which is the correct contour of the shell. Six automatics are used to cut and face the boat tail end and to cut the rifling band groove in the shell. These automatics are shown in the foreground in Fig. 7.

The shells are then weighed and checked for gage, and the set screw hole for the fuse plug is drilled and tapped, followed by the tapping of the thread inside the shell nose. Following an inspection for wall thick-

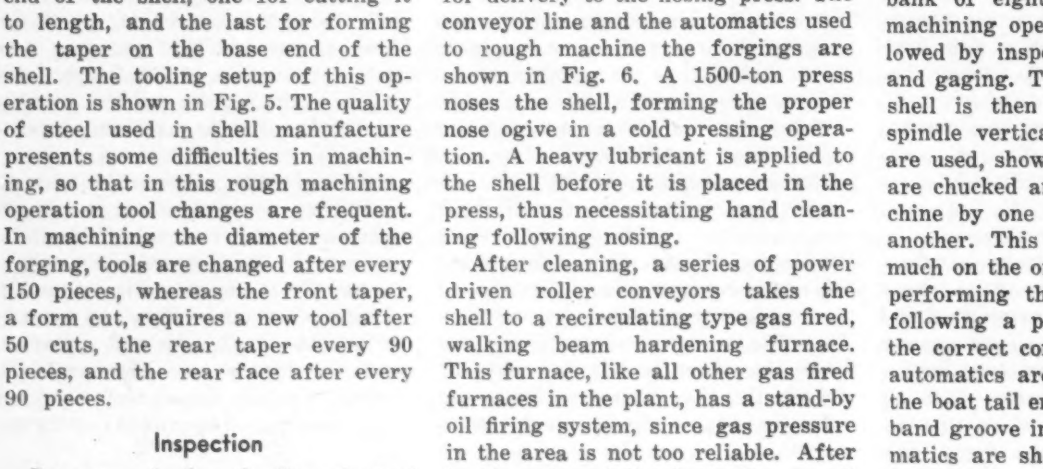


FIG. 6 — From rough machining operations, the projectiles are carried on a roller conveyor to the nosing press. This general shop view shows the extensive use to which roller conveyors have been put. The whole shop is completely conveyorized with the above type, overhead lines with specially designed holders, and motor driven chain types.

ness, the rifling band groove is knurled and the rifling band pressed onto the shell by band setters.

### Rifling Band

The rifling band is then finish turned on single-spindle vertical turning lathes, and another single spindle vertical turning lathe is used to finish turn the two bourrelet bands on the shell. The projectile at this point is completely machined to size, as shown in Fig. 8.

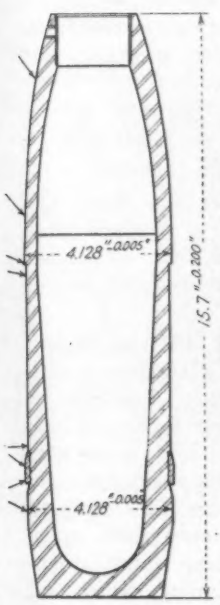



FIG. 8—Shown here is a dimensional drawing of the finished shell. Arrows along the top show the points around the shell that are checked by the Multicheck Electrogage. All other dimensions are hand checked, and the shell must be within a narrow weight range

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To insure against metal defects in the base of the projectile, the base plate is welded on a two-headed rotary seam welder, forming a series of overlapping ¼-in. spot welds about 3/16 in. from the outside edge of the base plate. Notches are then cut in the nose of the shell, and the shell passes to final overall inspection station.

The nose threads are checked, as are the nose diameter, fuse plug threads, the base plate weld, the rifling and bourrelet bands, and the weight of the shell, which is at this stage 26 lb. The shell is placed in a Multicheck Electrogage, which checks the shell concentricity at eight points. This machine, by a light system, rejects projectiles that are in any way out of line. Following an identification stamping, which is performed by Army inspectors after an Army inspection, the shell is then cleaned in a cleaning machine with an alkali wash and rinse preparatory to painting.

Loaded on a circular conveyor, the shells then pass into a paint spray booth with a water wash air exhaust. The spray is tripped by the shell, and sprays the inside of the shell with a black enamel and the outside with a brown flat paint. The conveyors are built in such a manner as to provide a mask for the brass rifling band on the shell during the paint spraying. After the shells are unloaded from the spray conveyor, they are ready for packaging and shipment.

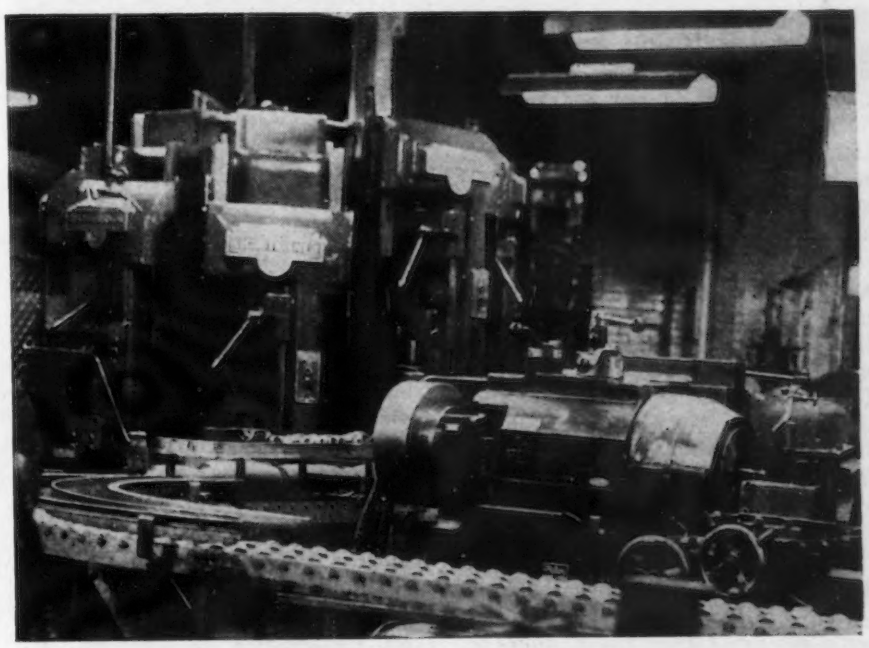

FIG. 7—An eight-spindle vertical lathe that works on the principle of a profile cutter is used to finish machine the outside of the projectile. This machine is hand loaded and unloaded from a single point, the spindle stations revolving around the machine.

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### TABLE I

Manufacturing Steps in Finishing 105 mm. High Explosive Steel Shell

(1). Torch cut 18-ft. lengths of bar stock into double forging lengths.

(2). Heat bar stock to forging temperature in eight 7-station induction heaters.

(3). Upset forge bar stock into shell forgings on eight National Machinery Co. upsetters.

(4). Cool on conveyor line.

(5). Center drill forging, 4 drill presses.

(6). Rough machine forging, eleven semi-automatic lathes.

(7). Form ogive on shell nose, one 1500-ton hydraulic press.

(8). Clean shell prior to hardening, hand cleaning.

(9). Heat to hardening temperature, one walking beam hardening furnace, gas fired with oil heating standby.

(10). Quench in oil pit.

(11). Draw, one walking beam draw furnace, gas fired with oil heating standby.

(12). Shot blast inside shell, one 4-station shotblaster.

(13). Automatic Brinell test.

(14). Machine nose diameter, turn and face nose. Eight lathes.

(15). Finish machine outside of shell, two 8-spindle vertical turning lathes.

(16). Cut and face boat tail end and cut rifling band groove, six semi-automatic lathes.

(17). Drill and tap fuse plug set screw, hole, three tapping machines.

(18). Thread inside nose, two tapping machines.

(19). Knurl band groove, two knurlers.

(20). Place and set brass rifling band, three band setters.

(21). Finish turn band, one single-spindle vertical lathe.

(22). Finish turn bourrelet, one single-spindle vertical lathe.

(23). Weld base plate of shell, one double-headed rotary seam welder.

(24). Cut staking notches in nose of shell, one wheel grinder.

(25). Roll stamp Army identification, one roll stamp.

(26). Alkali wash, one wash and rinse unit.

(27). Paint spray inside and outside of shell, one water wash air exhaust spray.

(28). Pack for shipping.

# . . . Development of the

By HOWARD A. KNOX
*Assistant to Manager of Sales, Tin Plate Division, Carnegie-Illinois Steel Corp.*

ALTHOUGH United States Steel Corp.'s subsidiary, the American Sheet & Tin Plate Co., had approximately 71 per cent of the industry's capacity in 1908, by 1910 it had dropped to 61 per cent and to 50 per cent by 1913. The trend continued downward until it leveled out in later years, never approaching anything over the 40 per cent mark. This was not unexpected, considering that competition had been fostered, and that the nation's demand for tin plate was reaching greater proportions due to the strides made in can manufacturing and food packing. Generally, however, there was sufficient business for everyone to maintain reasonable operations. It should not be inferred that there was not keen competition for business. It was not, however, of the ruinous nature of the late nineties, since tin plate producers were not so far removed from the close of the last century that they could not profit from the mistakes of that period. Those in existence grew stronger and there was a tendency on the part of certain large steel producers to enlarge the finishing phase of their business by entering the tin plate business. The number of non-integrated companies making an attempt to produce tin plate was in the minority.

The Jones & Laughlin Steel Co., being a well-established integrated producer of steel in the Pittsburgh district, saw an opportunity to expand in a promising field by erecting a tin mill, which it did at Aliquippa, Pa., in 1909-10. This was the initial step taken by large integrated producers who were already well entrenched in the other steel products, and was followed in later years by the Bethlehem Steel Co., Youngstown Sheet & Tube Co., the Inland Steel Co., and Crucible Steel Co. of America.

Although the Wheeling district was a center of early operations in the tin plate industry, three of the original producers, the Aetna Standard Iron & Steel Co., the tin mill of the LaBelle Iron Works, and the Laughlin Nail Co., had since 1898 been a part of the American Tin Plate Co. and then subsequently the United States Steel Corp. The Whittaker-Glessner Co., Wheeling, since 1900 included in the Wheeling Corrugating Co., was another of the Valley's original tinning operations. At the time the American Tin Plate Co. acquired the tin mills in this district, a pledge was made that for a period of years the former owners would not re-enter the tin plate business. This feature, no doubt, accounted for the limited ownership in this section.

Merchant & Evans Co., Philadelphia, (formerly Merchant & Co.) however, transferred its tinning plant from Philadelphia to Warwood, W. Va., in 1912, but this unit was abandoned some years later. By 1913 I. M. Scott's pledge had expired and he resigned from the LaBelle Iron Works in Wheeling to organize the Wheeling Sheet & Tin Plate Co., Yorkville, Ohio, in 1913. This company operated only a short time under that name, for in 1914 a combination of Wheeling interests prompted the acquisition of the Wheeling Sheet & Tin Plate Co. by the Wheeling Steel & Iron Co., which was further consolidated in 1920 with the Whittaker-Glessner Co. and the LaBelle Iron Works to form the Wheeling Steel Corp. This move was a logical and significant one since the LaBelle Iron Works needed finishing capacity and the other two mills were equally in need of their own sheet bar source.

Prior to World War I and during its course, the following significant developments occurred: The sizable Bethlehem Steel Co., like the Jones & Laughlin Steel Co., decided to add to its finishing capacity and so started construction in 1916 and completed in 1917 a sizable tin plate mill at Sparrows Point, Md., having an approximate annual capacity of 2,000,000 base boxes. Fast developing export business, combined with Bethlehem's Eastern capacity for steelmaking, made this seaboard location a natural one.

Other new mills of this period included the following, all in the Pittsburgh, western Pennsylvania, and eastern Ohio area:

Massillon Rolling Mill Co., Massillon, Ohio, started to produce black plate for tinning in 1908-09.

Deforest Sheet & Tin Plate Co., Niles, Ohio, began to produce black plate for tinning in 1909. This plant was acquired by the Republic Iron & Steel Co. in 1919.

American Rolling Mill Co., Middletown, Ohio, added a tinning department to its Zanesville, Ohio, plant in 1912, first producing ternes in that year but not producing tin plate until 1915. Six stacks were equipped for ternes and one for tin. This company later retained the terne plate equipment to produce long terne sheets, but discontinued tinning, which had been on a rather small scale.

Trumbull Steel Co., Warren, Ohio—1913. This mill had a capacity of approximately 1,000,000 base boxes. The company was subsequently merged with the Republic Iron & Steel interests in 1928, later becoming the Republic Steel Corp.

Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, started production of black plate but not tin plate in 1914.

Hudson Sheet & Tin Plate Co., Marietta, Ohio—1917-18. This plant eventually was acquired by the W. F. Robertson Steel & Iron Co., who also had purchased the other Marietta mill (finally the Pittsburgh Tin Plate & Steel Corp.). The Hudson plant was not operated after 1921 nor the Pittsburgh works after 1926.

## U. S. Tin Plate Exported

Tin plate production in the United States passed the 1,000,000 ton mark in 1912, falling below the figure only twice; once in 1913 and again in 1921. Including black plate, the industry has not since been under 1,000,000 tons. It was during 1911-12 that the sizable tonnages of Welsh plate formerly imported for re-export purposes were taken over by the

# American Tin Plate Industry . .

***. . . The impact of two wars and the technological developments, namely cold reduction and electrolytic tinning, of the intervening years conclude this three-part discussion of the progress of the tin plate industry.***

American mills, who gave a drawback on re-export to equalize the Welsh price, which permitted 99 per cent of the duty to be refunded where re-exported. In 1913 American imports were less than 2 per cent of production. By this time exports to neutral markets of the following amounts were begun, Canada being the largest customer.

| Year | Total Exports (Including Canada) net tons | Canada net tons |
|---|---|---|
| 1911 | 68,747 | 32,095 |
| 1912 | 91,497 | 52,746 |
| 1913 | 64,750 | 50,174 |
| 1914 | 66,695 | 39,770 |

The beginning of World War I brought its complications to American industry. The principal concern of the tin plate industry was getting enough steel to roll, and tin from abroad. After America's entry into the war on April 6, 1917, the needs of the tin plate industry were more than ever recognized. Among the slogans of the day was "Food Will Win the War." Tin plate was considered just as important as sheet steel since troops could not fight and advance on empty stomachs. The hermetically sealed tin can did a great deal to contribute to the ultimate outcome in 1918. Tin, during the war, fluctuated around 70c. a lb. but, due to central purchasing, the available supplies were equally distributed without ruinous effects. The year 1918 ended with a production of 1,780,000 tons, including black plate; just 10 per cent below the peak year of 1917 of 1,958,000 tons. Comments on the war years would not be complete without briefly reveiwing the price situation. The price of tin plate is listed in "Metal Statistics" as being $3.20 per base box, Pittsburgh, Dec. 3, 1914, and there are first-hand reports of a reliable nature to the effect that it was even lower in 1915. This condition did not long exist, as prices reached $15.00 per base box and higher during this time.

## Postwar Period

With the exception of the year 1921 when an economic slump occurred, production continued to ascend steadily during this period, finally passing the 2,000,000 ton mark in 1923. In the 21 years from 1891 to 1912, the industry had attained the first 1,000,000 ton year, and now in but 11 more years, this annual production figure had been doubled. The improved standards of living in America demanded nutritious foods, conveniently and best supplied in cans. The research efforts of those in and supplying the food industry were in ample evidence, and other processed food containers were also on the up-grade. Tin plate exports had averaged over 250,000 tons annually or from 13 per cent to 15 per cent of production in 1916-20. Due to the comeback made by the tin plate industry in the United Kingdom and the growth of European producers, American exports dropped materially until 1926. Japan and Canada were the best customers. China needed tin plate for oil cans and Argentina preferred American tin plate for meat packing.

During this period there was marked competition among tin plate producers, particularly when postwar export business receded badly in the years of 1921-23. The highest production so far for tin mill products was reached in 1929, 2,077,673 tons of tin and terne plate, and 426,083 tons of black plate were produced in that year for a total of 2,503,756 tons. Most people, however, remember more vividly the undesirable part of the year 1929, the month of October and later, when the greatest business depression in American history began to get under way with the financial disasters of Wall Street.

The tin plate industry had been limited in its spread westward but the Chicago district had a substantial addition in 1926 when the Youngstown Sheet & Tube Co. constructed a tin mill at Indiana Harbor, Ind., having a capacity of about 2,200,000 base boxes. Here was another large independent enlarging its finishing facilities. Also, the Continental Can Co. in 1927 built a tinning plant at Clearing, Ill., capable of producing about 2,000,000 base boxes annually to be used in its own manufacture of cans. Development farther westward had been confined to the start of construction by the Colorado Fuel & Iron Co., in 1902 at Pueblo, Colo., which was never completed. In 1928 the Columbia Steel Co., San Francisco, constructed a tin mill having an annual capacity of 31,000 tons, at Pittsburg, Cal. This was purchased by the United States Steel Corp. in 1929 and operated by its export subsidiary, the United States Steel Products Co., and in 1930 by the Columbia Steel Co., its Pacific Coast subsidiary.

Another event transpired during 1929 which, although of an entirely different nature, was to become of far-reaching importance to the world's tin plate industry. This was the commercial cold reduction of light gage strip steel in tin plate gages and sizes. Not only did this new product possess unusual properties of ductility, but as developments later revealed, its corrosion resistance for food packing was far superior to any plate ever produced by the hot rolled method, which of course was the only practice employed until this time.

## Cold Reduction Process

The advent of the cold reduction process was almost as important to the tin plate industry of 1929 as was the rolling of sheets by means of rolls in 1728. This was the crowning development in rolling steel to thin gages in 201 years. The development of the cold reduction of steel in wide strip form had been closely studied and its success was dependent upon improvements in electrical controls, bearings, and other mechanical details. Much credit is due to I. M. Scott, then president of the Wheeling Steel Corp., who undertook the first commercial production of cold reduced tin mill products. The prin-

FIG. 5—Hot rolling black plate in about 1914. Furnaces for heating the sheet bars and sheet "breakdowns" are shown in the background. The workman at the entrance side of the hot mill is the roller and the man on the other side of the mills is the catcher. Considerable skill was required in hot mill operations. (Courtesy of the Washington Tin Plate Co.)

cipal advantage of this material was in its improved drawing properties, since the cold reduction process permitted the use of lower metalloid steel than did the hot rolled method.

The beginning of the use of cold reduced tin plate was for other than food cans and crown caps. The performance was so outstanding that further tests were conducted, and it was discovered that plate of this type possessed remarkable corrosion resistant properties in addition to its other advantages, particularly in connection with certain "wet packs."

Installation of equipment for cold reducing tin mill products was not something that could be accomplished immediately. In many instances top-flight executives had to be convinced, plans projected and financial appropriations presented to directors. Mill equipment people could not progress too rapidly with construction because of their limited knowledge of this new type of equipment. In the scramble to remain competitive, a feature which is under constant attention in the tin plate business, due largely to the relatively few buyers of tin plate as compared to other products, the industry came to the realization that that portion of production which could not be modernized for some time must at least be improved. Much credit is due to all of those mills without any or sufficient cold reduction facilities for tin plate, for they made considerable improvement in the hot pack product by radical departures from practices which in principle had remained relatively stationary for many years. This was largely accomplished by thermal and mechanical changes; also lower metalloid steel was given more prominence, and although not comparable to a cold reduced tin mill product, it led to considerably improved standards while the gap was being bridged.

Although the country was experiencing a bad business year in 1930 and capital expenditures were not looked upon too favorably in many quarters, it was evident to some few that not only was the cold reduction method a necessity, but a means of becoming even better established in a competitive age if a superior product could be produced. The ambitious Weirton Steel Co. was not very far behind Wheeling, installing equipment in 1930. The United States Steel Corp. subsidiary, the American Sheet & Tin Plate Co., had a cold reduction mill operating at its Gary Tin Mill in 1931. The balance of the independent tin plate mills waited several years but all, except the N. & G. Taylor Co., Canton Tin Plate Co., Washington Tin Plate Co., the McKeesport Tin Plate Co. and Standard Tin Plate Co., who were non-integrated mills, were quietly doing their best to get equipment installed and operating. The Follansbee Brothers Co. was the only mill not rolling its own hot rolled strip who installed any cold mill capacity, but in a limited way.

Despite this prominent trend toward new equipment, two companies were not to be daunted and started to produce tin plate by the hot rolled method. Their equipment, however, was neither newly built nor mechanized and most likely their limitations were realized by both. These two concerns were:

Canton Tin Plate Co., Canton, Ohio, which was organized in 1930 by W. H. Davey, long well known in the sheet and tin plate industry, purchasing the plant of the former Falcon Tin Plate Co. which had been built and first operated by the Carnahan Tin Plate & Sheet Steel Co. This company operated until 1936 when it was sold to the Republic Steel Corp. who dismantled it.

The Empire Sheet & Tin Plate Co., Mansfield, Ohio, was organized in 1933, and produced tin plate in 1935 and for several years subsequently, but was limited in gage range since its Mansfield, Ohio, rolling mill was primarily designed to produce sheets. This concern was previously the Mansfield Sheet & Tin Plate Co. and the Empire Steel Corp. W. H. Davey had headed both organizations until forming the Canton Tin Plate Co. in 1930.

Although this paper has not necessarily been concerned with the mortality of concerns, since it deals with the progress of the industry, it is noteworthy that the N. & G. Taylor Co., Cumberland, Md., for some years a subsidiary of Corrigan, McKinney Steel Co., now lost its identity when it was acquired by the Republic Steel Corp. in 1935. The N. & G. Taylor Co. represented the oldest independent mill still operating and had found its early success by importing

Welsh tin and terne plate. The continued demand for cold reduced plate did not justify the further existence of this mill so it was subsequently closed.

The Chicago territory with its industry and surrounding agricultural states had fostered the growth of tin mills of the United States Steel Corp. and the Youngstown Sheet & Tube Co. located at Gary, Ind., and Indiana Harbor, respectively. This situation had not escaped notice by the energetic Inland Steel Co., nor had the fact that the tin mills were operating fairly well in the early depression years as compared to other steel lines. There was still room for another unit in this section so it was logical that Inland, with its steelmaking and hot rolled strip capacity, should install cold reduction equipment at its Indiana Harbor works and throw its hat in the ring in 1934. The Inland Steel Co. had the advantage of having all modern equipment, capable of supplying a product which was much more in demand than hot rolled plate, the latter grade still constituting about 87 per cent of the industry's production in 1934.

### Effect of Depression Slight

Although business in general and the steel industry in particular was having a most difficult time during 1930-36, the tin plate industry suffered relatively little. Production during the years 1931 and 1932 was 16 per cent and 41 per cent lower respectively than the banner year of over 2,500,000 tons in 1929. This was related to a great extent to a severe decrease in export trade during those two years. Tin mill production for some years had constituted about 6 per cent of the total steel production. In 1931 it reached 8 per cent; 1932, 11 per cent; 1933, 12 per cent; and then leveled off to 9 per cent in 1934 and 1935. There were, of course, basic reasons why tin mills operated at 60 per cent to 90 per cent of capacity during this trying period while the rest of the steel industry was struggling somewhere between 15 per cent and 60 per cent.

The tin plate business is dependent largely upon the container industry for its outlets. The requirement of the container industry is in turn a derived one, dependent upon the public demand for containers. Packers' cans constitute about 55 per cent or better of all cans produced and food consumption does not decline proportionately with consumers' income. While consumers' income fell more than 28 per cent from 1929 during 1932, food production declined only about 10 per cent.

The other 45 per cent of can production is general line or non-processed cans. Since this classification includes such items as paint and varnish cans, tobacco, coffee, spice, and meat cans and a great variety of others, it was to be expected that a lower demand would be in effect during the depression years. This did occur in some lines, but was offset by the development of new and diversified uses for tin cans. Most notable among new products was the oil can demand in 1934 and the beer can in 1935. The recession that tin plate had undergone in the export field during 1931 and 1932 was beginning to be overcome by 1933. United States exports of that year doubled those of 1932 and continued to increase.

Crown Cork & Seal Co., Baltimore, the largest manufacturer of crown caps, had readily realized the superiority of cold reduced tin plate for crowns, as well as for its screw cap line. When unsuccessful in being able to contract for enough cold reduced plate, the company decided to install a tandem cold reduction mill in 1935, purchasing hot rolled strip from an outside source. This led to a further demand for cold reduced plate from the independent cap makers.

The cold reduced method accounted for only 24 per cent of the country's

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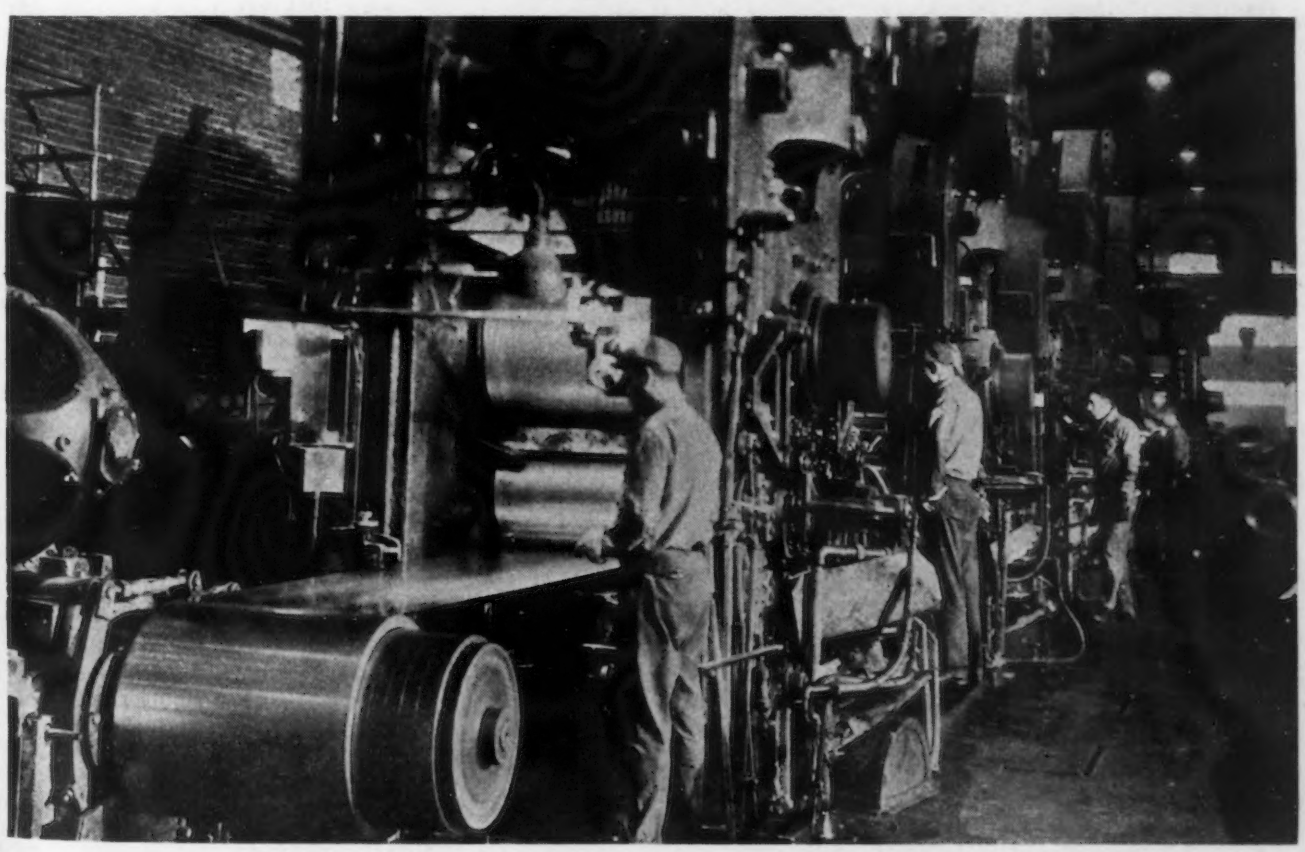
FIG. 6—The original cold reduction tin mill in the United States. It was first operated by the Wheeling Steel Corp. at Yorkville, Ohio. (Courtesy of the Wheeling Steel Corp.)



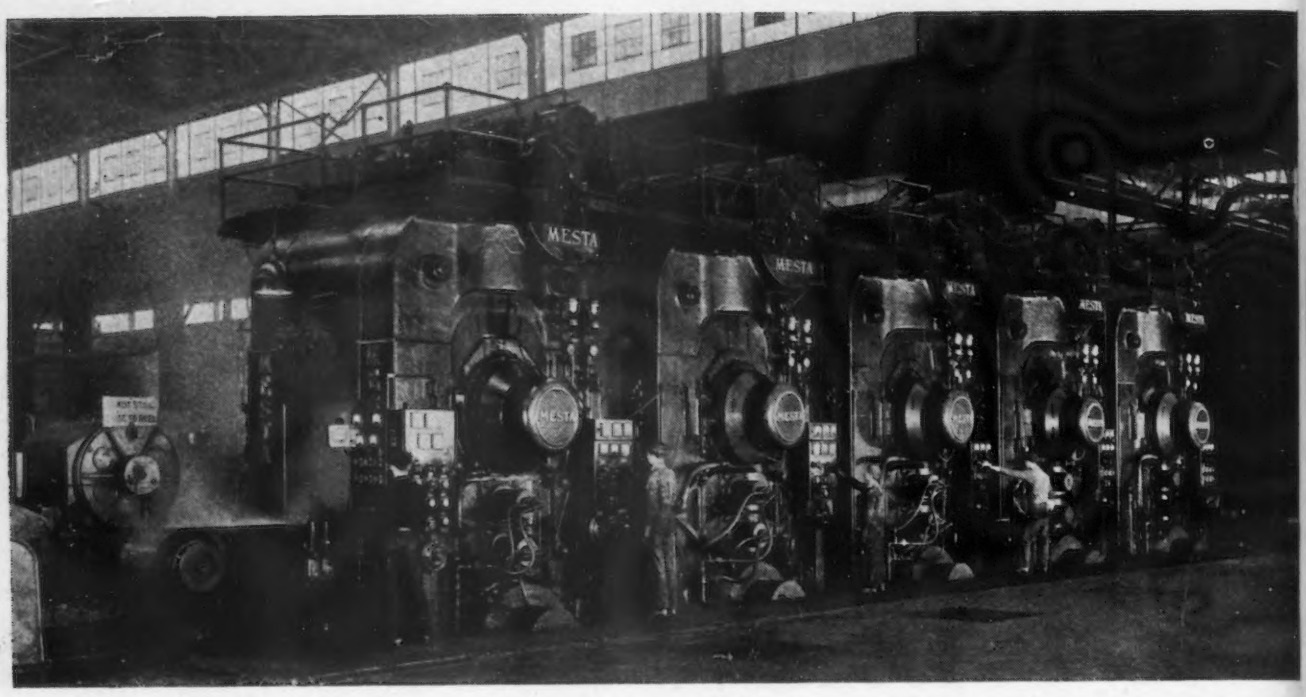



FIG. 7—A modern five stand tandem cold reduction mill, typical of the equipment which has replaced hot pack mills.

tin mill production in 1936. During that year, however, the Bethlehem Steel Co., the Granite City Steel Co., and the Youngstown Sheet & Tube Co. installed their initial cold reduction equipment even though it had been only 10 years since the Youngstown Sheet & Tube Co. had built a complete hot mill. The industry now began to realize that certain auxiliary equipment was needed in addition to cold reduction itself if the best results were to be secured. Automatic shearing lines began to appear, as did temper mills and increased coil annealing facilities.

On June 1, 1936, United States Steel Co.'s sheet and tin plate producing subsidiary, the American Sheet & Tin Plate Co., merged with the Carnegie-Illinois Steel Corp. This was primarily for the same purpose that other consolidations had taken place within the Corporation in previous years, even as far back as the early days of its formation; namely to secure greater efficiency and distribution by combining management and operations.

## Electrolytic Tinning

For some years the subject of electrolytic tinning had been carefully studied and experiments conducted. The possibilities held considerable promise of saving tin and securing a uniform coating. In 1936-37 the experiments had progressed sufficiently to justify the actual commercial production of electrolytic tin plate. United States Steel Corp. had been investigating the electrolytic coating of strip and began production on a larger scale at the Gary Sheet & Tin Plant of Carnegie-Illinois Steel Corp. The Crucible Steel Co. of America was one of the early pioneers in electrolytic tinning and installed a cold reduction mill at its Midland, Pa., Works. Crown Cork & Seal Co. saw the possibility of saving tin in its production of crown caps, since about 1 lb. of tin per base box could be saved without detriment to their product, so lost no time in joining the procession. With the exception of the Weirton Steel Co., who started a "pilot" line, the independent producers did not install equipment for some time. Electrolytic tinning was the first commercial departure from the conventional way of tinning by hot dipping. There were some few individuals in the industry who were convinced of the opportunities of quality control and saving of tin. In these times of tin scarcity the nation is greatly indebted to those few for their foresight and conviction on this subject.

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The year 1937 was a sizable one for the steel industry and particularly for tin plate, due to the tremendous volume of can business. More than 16,000,000,000 cans were produced in this country, having a product value of about $350,000,000 as compared to $41,000,000 in 1904. More than 630,000,000 beer cans were produced during the year, having a $14,000,000 value or 4 per cent of that of all cans produced. Cold reduced tin plate product now represented about 36 per cent of the plate produced and it was at this time that the Jones & Laughlin Steel Corp. and the Republic Steel Corp. added to their cold reduction facilities. The Youngstown Sheet & Tube Co. installed additional equipment in 1937, but its largest unit was not added until 1939. The production of 3,188,000 tons in 1937 was the greatest to that date. Exports totaled over 400,000 tons, a heretofore unheard of tonnage of tin plate for export.

In 1938 the new and modernized tin mills of the United States Steel Corp., including its complete preparations for electrolytic tin plate, came into being; Carnegie-Illinois Steel Corp.'s Irvin Works and the installation of a plant by the Tennessee Coal, Iron & Railroad Co. at Birmingham. The United States Steel Corp. was then anticipating the time when the major part of its tin plate production would be electrolytically coated.

Production in 1937 was abnormal in several respects and in 1938 decreased more than 1,000,000 tons. Were the tin plate buying of 1937 and 1938 to have been averaged, both years' tin plate production would not have been much under 1936, which was a good year (2,782,000). Excellent business conditions and the possibility of a second World War, plus a tremendous export demand, contributed to a production of about 3,000,000 tons in 1939. During the slump of 1938 a number of the tin plate producers dismantled their hot mill units in order to utilize the newer equipment. Those not dismantled, and wherever possible, were started again in 1939. Cold reduced

production represented 59 per cent and 75 per cent, respectfully, of the tonnage produced in those years.

The beginning of World War II in September, 1939, and its effects are well known. This country had been enjoying a period of good business and in 1940 began to receive orders from foreign governments, further contributing to a greatly increased general line demand. Although sanitary cans always have had a relative stability, consumers' income now permitted an increased use of beer cans; more cars were driven, consuming canned oil; houses and barns were painted; and all kinds of luxury items packed in cans were moving. Furthermore, the export of tin plate surpassed the 1937 level. It was during 1940 that the well-known McKeesport Tin Plate Co. was sold to the Jones & Laughlin Steel Corp. and subsequently dismantled. During this year and 1941, Follansbee Steel Corp. installed two reversing cold mills. This company was the only non-integrated producer who was cold reducing tin mill products. The conditions of 1940 continued on through 1941, accentuated more than ever by the thought that were the United States to enter the war, certain goods possibly could not be put into tin cans. An already heavy current demand was increased by the sale of canned goods, and especially evaporated milk, to England and its possessions. Canada was in the war and its steel was needed for armaments and tin plate shipments formerly received from the United Kingdom had to be replaced with American plate, as well as black plate for tinning. The industry was laboring to achieve maximum production, and it was during this year that the Carnegie-Illinois Steel Corp. acquired the Standard Tin Plate Co. at Canonsburg, Pa. Final figures for 1941 show that the industry produced over 4,000,000 tons.

## Impact of War

The Japanese attack on Pearl Harbor and their rapid acquisitions in the Far East, including the Malay States and the Dutch East Indies, deprived the United Nations of their principal source of tin. This was a very serious matter at the time of our entry into the war and would have been a great deal more so were it not for two principal factors that became increasingly evident in 1942. The Metals Reserve Corp. had acquired a substantial stock of tin and tin concentrates, as well as completed an agreement with Bolivian producers in November, 1940, for tin concentrates. Thus, although our stock pile was not adequate to support accustomed consumption for an indefinite period, it provided a supply for war needs and essential civilian use until something could be done about smelting tin in this country. The Tin Processing Corp. was organized on Feb. 5, 1941, to construct a tin smelter at Texas City, Tex., and by Easter Sunday, April 5, 1942, the first tin ingots were poured. This smelter is currently supplied with tin concentrates from Bolivia and while production figures are not available, it is understood that excellent progress has been made.

The tin plate industry undertook the program of building enough electrolytic lines to cut tin consumption to the very minimum. Assuming that 0.50 lb. coating per base box could be used instead of 1.25 lb. which is the nominal minimum on hot dipped plate, there was a 60 per cent reduction to whatever extent electrolytic plate could be produced and consumed. In addition to the three existing units, a building program covering 25 additional lines was projected for completion during 1942 and 1943. The program was divided as follows:

| | New Lines | Existing |
|---|---|---|
| United States Steel Corp.: | | |
| Tennessee Coal, Iron & Railroad Co. | 3 | .. |
| Carnegie-Illinois Steel Corp. | 6 | 1 |
| Crucible Steel Co. of America | .. | 1 |
| Wheeling Steel Corp. | 1 | .. |
| Republic Steel Corp. | 2 | .. |
| Inland Steel Co. | 2 | .. |
| Jones & Laughlin Steel Corp. | 2 | .. |
| Granite City Steel Co. | 1 | .. |
| Youngstown Sheet & Tube Co. | 2 | .. |
| Bethlehem Steel Co. | 3 | .. |
| Weirton Steel Co. | 3 | .. |
| Crown Cork & Seal Co. | .. | 1 |
| Total | 25 | 3 |

This equipment when fully completed is estimated as being capable of producing approximately 40,000,000 base boxes annually. The tin plate industry also undertook the construction of 18 chemical treatment lines, having an estimated capacity of between 9,000,000 and 10,000,000 base boxes, to prepare black plate for certain can requirements where the product packed would permit enameling to be employed instead of tin coating. Although important to the conservation program, the application of chemically treated black plate appears to be limited and of secondary importance to electrolytic tin plate.

There were other contributions of a most important nature during this period. Restrictive orders on cans

FIG. 8—Tinning black plate in a modern tin house. This method is in current use but is being replaced to a considerable extent by the electrolytic tinning process.

and closures were put into effect. The use of tin mill products was confined to essential needs in order that both steel and tin could be conserved for the war effort. Every possible endeavor was made by responsible steel people, both in Washington and at home, to see that the necessary demands for tin plate were fulfilled. During the fourth quarter of 1942 the very limited production of plate called for cold reduced to such an extent that United States Steel Corp. was forced to cease all hot rolled tin plate production at the Columbia Steel Co. and the Gary Sheet & Tin Plant of Carnegie-Illinois Steel Corp., as well as its plant at Canonsburg, the latter plant being dismantled. The year 1942 ended with a production of 3,077,000 tons.

Some of the new electrolytic equipment was completed late in 1942, and 1943 is expected to see completion of the program. The use of electrolytic tin plate created many problems for both the can makers and the tin plate producers. Although electrolytic plate had been used for five years prior to this season's packs, the experience gained was in general line usages and with unmelted finishes. An outstanding exception to this were vacuum caps for baby food in glass jars. For the first time, process rusting was eliminated. An enameled 0.50 lb. coating per base box outperformed 1.50 lb. hot-dipped coating with the same enamel. Experimental packs had to be made and various tests conducted, all of which took time. Recent indications are, however, that the range of applications is fast broadening, evaported milk being one of the largest items involved. It is generally conceded that the tin plate industry will, by the close of this year, have accomplished a transition that normally would have required no less than 10 years.

Until the advent of electrolytic tin plate, improvements in tinning practice had been gradual and progressive. Major developments in rolling and in steel making paved the way for further steps of technological advancement. Indications are that the postwar period will be one of refinement of all these features, with the principal development being in electrolytic coatings. Coating weights ranging from 0.10 lb. to 0.50 lb. per base box are expected to be adopted for general line purposes as soon as conditions warrant the use of steel and tin. Many items that formerly were using lacquered black plate are logically expected to require electrolytic plate because of the lessening of the rust hazard, increased die life and a better and more attractive base for lacquering. The experience gained with sanitary cans and closures for glass containers will very probably justify not only a retention of most of the present packers' can applications, but even accelerate a wider usage of electrolytic plate for food applications.

The last phase of existence of the hot rolled method of producing tin plate in the United States has occurred for the Washington Tin Plate Co., Washington, Pa., closed its plant permanently in 1943. Tin plate producers of today may be listed in the approximate order of their production capacity as follows:

| Company | Year of beginning of initial units |
|---|---|
| U. S. Steel Corp. | 1890 |
| Weirton Steel Co. | 1905 |
| Bethlehem Steel Co. | 1918 |
| Wheeling Steel Corp. | 1895 |
| Youngstown Sheet & Tube Co. | 1926 |
| Inland Steel Co. | 1934 |
| Jones & Laughlin Steel Corp. | 1910 |
| Republic Steel Corp. | 1913 |
| Follansbee Steel Corp. | 1892 |
| Granite City Steel Co. | 1890 |
| Crown Cork & Seal Co. | 1935 |
| Crucible Steel Co. of America | 1937 |

The evolution and progression of the tin plate industry for the past 53 years has been noteworthy, but it is the considered opinion of authoritative sources that when ample and unrestricted supplies of tin are again available, the industry faces a bright future. The tin plate industry has kept pace with the container industry for each is dependent upon the other.

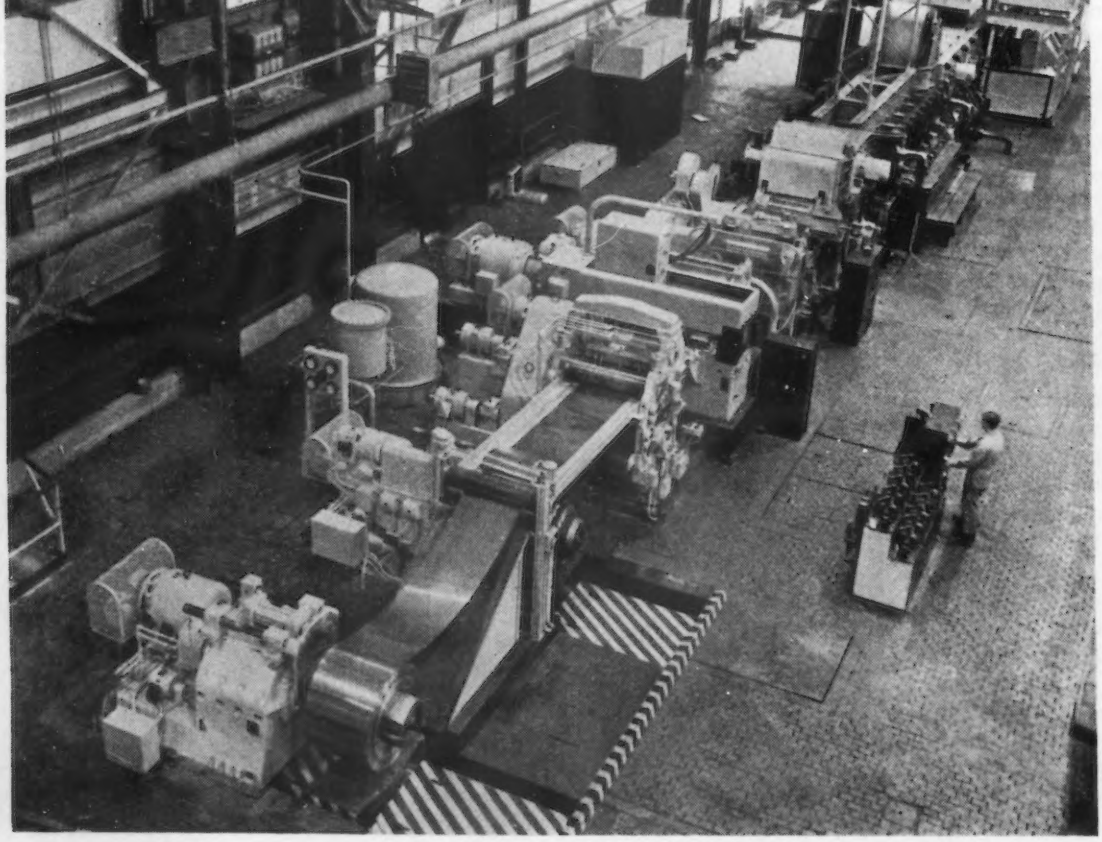


FIG. 9—An electrolytic tinning line. Entry end of line, showing uncoilers, is in the foreground, followed by shear, welder, drag bridle, pickling and plating tanks.

# Sprocket Hardening Speeded 133 Per Cent

THE hardening of 36 large sprocket teeth in less time than was formerly required for 18 is now being accomplished at the International Harvester Co., through the use of a novel automatic fixture installed on a new Tocco induction hardening machine. The hardening speed has been increased 133 per cent by this equipment.

The sprockets that go into the drive mechanism of Army half-trac combat vehicles are 24 in. in diameter. Before they were Tocco induction hardened, it took seven min. to harden one sprocket. Now with the automatic fixture, they are inductively hardened in pairs, one pair every 6 min.

The automatic fixture, shown in Fig. 1, was designed by Ohio Crankshaft Co., Cleveland, and is believed to have contributed much to the advancement of induction heat treatment, according to International Harvester Co. officials. Because this particular half-track sprocket is subject to the excessive wear only on its teeth, hardness is confined to those areas. The sprockets are hardened free of distortion, with complete uniformity of case, and piece ductility is maintained.

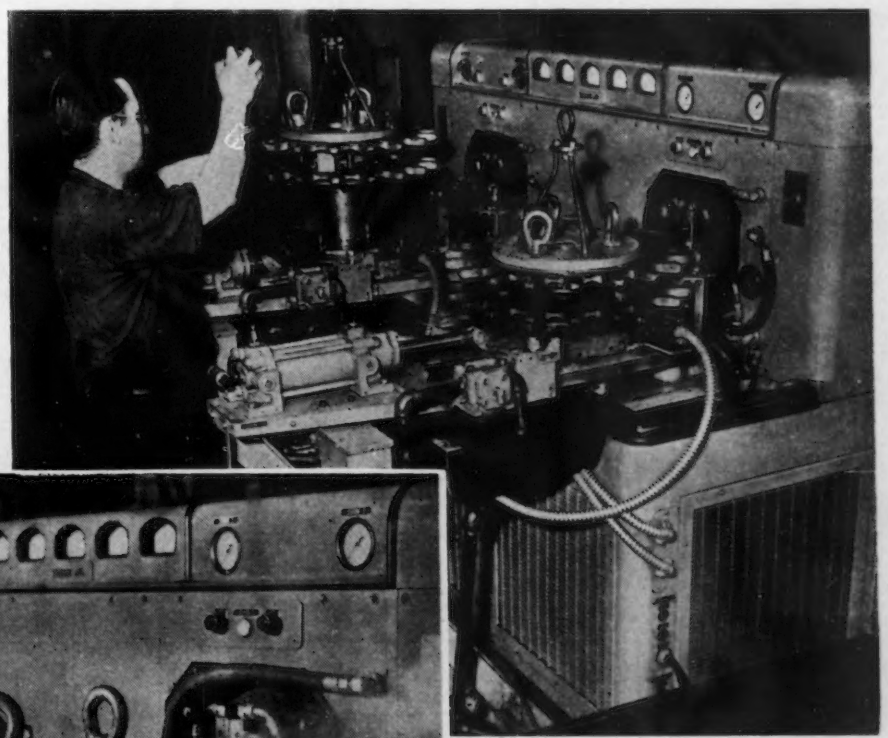
The automatic fixture holds two sprockets pancakewise, as shown in Fig. 2, hardening two teeth simultaneously. At the stroke of the hydraulic plunger, the fixture advances, introducing the teeth to the water-cooled inductor which is of a simple open style design. Upon completion of the hardening cycle the fixture withdraws the sprockets, indexes, and advances again to the inductor. The hardening cycle repeats itself, going completely around the periphery of the piece. Operation is entirely automatic once the starting button is pushed.

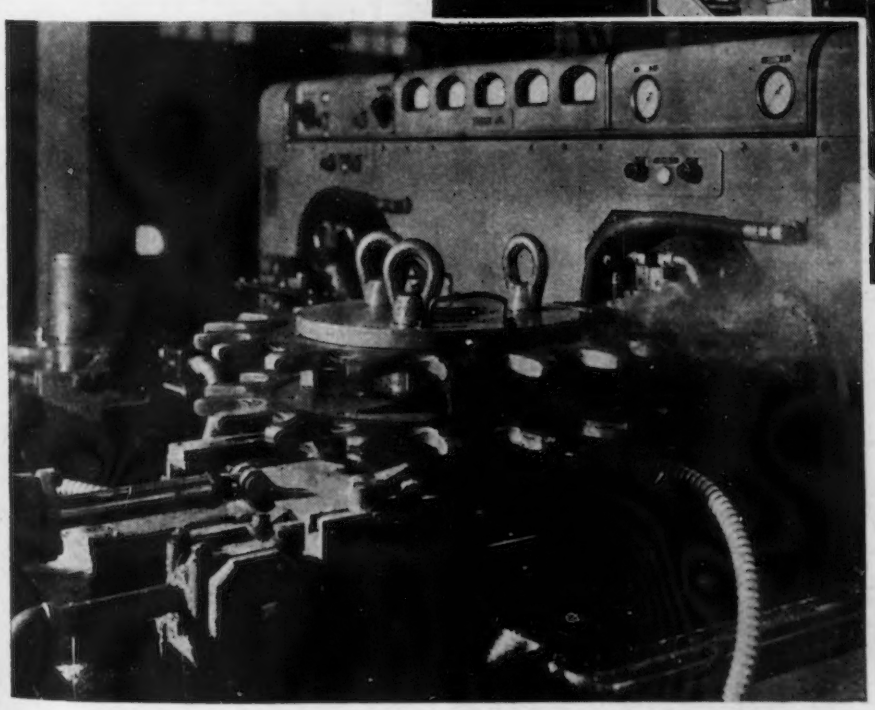
The heating cycle consists of a 10-sec. heat, 4-sec. quench, and 6-sec. index for a total of 20 sec. per two teeth. The Tocco unit is a standard 50-kw., two-station machine of 9600 cycles.

Teeth are 2¼ in. deep, 1¼ in. wide at the base and ⅝ in. at the top. A hardness of 51 to 58 Rockwell C is confined to the top and pitch line of the tooth, with depth not in excess of 5/32 to 3/16 in. The surfaces between the teeth of this style part are not hardened.

The sprockets are cut by torch four at a time from ¾ in. steel plate of a special analysis approximating SAE C1046. After the hardening, they are drawn and are then ready for final inspection and installation. Prior to hardening, the pieces have been completely machined.

Sprockets are placed in a special handling jig. The two pieces are held together by three turn bolts which pass through an upper plate and screw into a lower plate. The bolts go through holes in the sprockets. Two lock pins in the base plate of the fixture prevent the jig from rotating once it is positioned for hardening. An operator can disassemble and assemble two sets of sprockets in 4½ min.





ABOVE

FIG. 1—This automatic indexing fixture and jig holds two half-track sprockets for hardening of teeth. Tocco induction hardening machines harden two teeth simultaneously, and the fixture indexes the sprocket into position for the next hardening.

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LEFT

FIG. 2—Speeding up hardening by 133 per cent over previous methods used, this induction machine has two stations. Sprockets in the foreground are being hardened while the operator readies the second station.

# One-Step Assembly Etching

By T. E. PIPER

*Process Engineer, Northrop Aircraft, Inc. Hawthorne, Cal.*

o o o

GENERAL practice in the aircraft industry is to treat the surface of aluminum alloy sheets prior to spot welding either by wire brushing or by immersing each part of an assembly individually in a series of solutions. These solutions are usually four in number, consisting of a degreasing solution, a hot water rinse, an etching solution and a hot or cold water rinse. Hydrofluoric acid has been used extensively as an etching solution, and while this does remove the oxide film thoroughly, the immersion time is so critical and the hazards to personnel so great that it is generally agreed that something better should be developed. Besides hydrofluoric acid is not suited to assembly cleaning because of corrosion from acid left between mating surfaces. Cleaning of detail parts requires putting the parts in and out of the assembly jigs several times prior to spot welding and there is always the possibility of having finger prints get on the parts, thus promoting unwanted contact resistance and inconsistent spot welds.

In collaboration with local vendors, the Northrop process engineering department undertook development of a new etching and cleaning fluid capable of cleaning and etching complete assemblies in one operation. What was sought was a cleaning solution of low surface tension to make possible greater capillary attraction between the faying surfaces, yet one that would not cause corrosion between the faying surfaces or lapped joints if not entirely removed in the rinse.

FIG. 1—Contact resistance of 0.020 in. 24ST alclad sheets cleaned and etched in Northrop etching solution. Time of etching assemblies is limited to 10 min. because of the formation of a grayish-black film, which on individual stampings can be readily wiped off. (Data from Rensselaer Polytechnic Institute tests.)

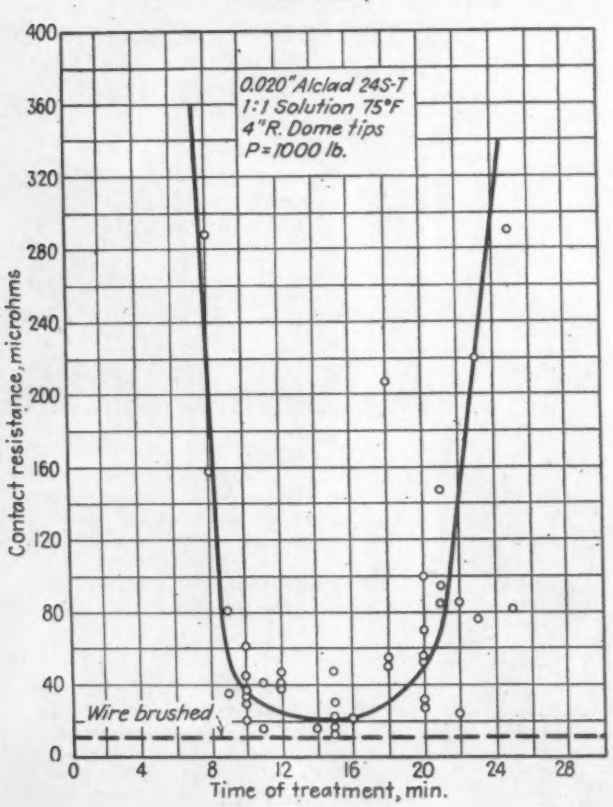
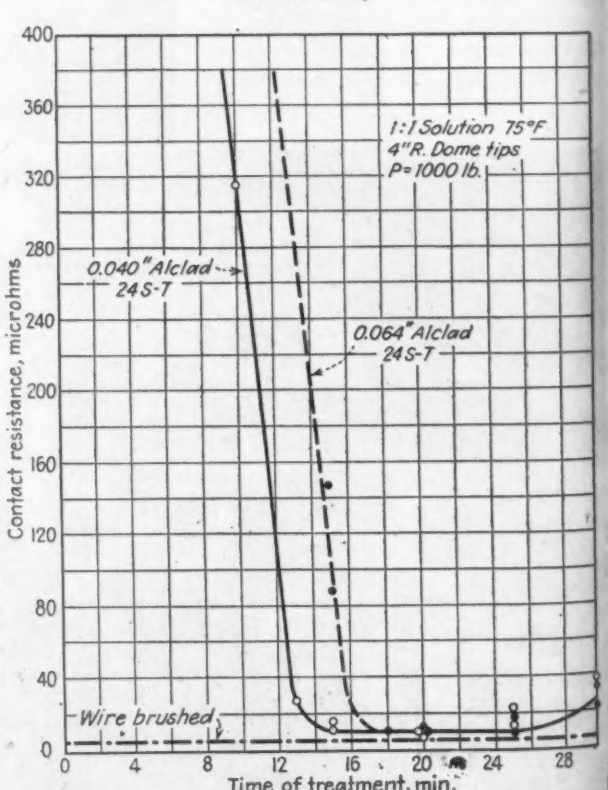



FIG. 2—Contact resistance of 0.040 and 0.064 in. 24ST alclad sheets cleaned and etched in Northrop etching solution. It will be noted that after 18 min. there is no further reduction in contact resistance, which then approaches very closely that of wire cleaned parts. The 10-min. maximum time limitation on assemblies applies here as in the case of the 0.020 in. gage material. (Data from Rensselaer Polytechnic Institute tests.)



# For Spot Welding Aluminum Alloys

***. . . Use of a new technique of etching and cleaning aluminum alloy sheet assemblies prior to spot welding has resulted in the saving of thousands of manhours and over 100 per cent gain in production of spotweld assemblies at Northrop Aircraft, Inc., by obviating the need for disassembly to etch detail parts and reassemble prior to welding. The quality of spot welds has been increased, exceeding Army shear strength specifications. In addition, almost unlimited production runs of detailed parts has been obtained without cleaning the electrodes.***

Other specifications set up were that the fluid should be capable of use at room temperature and the time of etching should not be too critical after the minimum time was reached. Furthermore, the fluid should be capable of sustained results and hence not subject to deterioration except through "drag-out." At Northrop, for example, the original fluid charged in the cleaning tank has been used for approximately two years with only periodic makeup additions.

### Phosphoric Acid Solution

Samples of various solutions were received and thoroughly tested in the laboratory and in actual production. The product finally decided upon is composed of phosphoric acid and a petroleum derivative used as a solvent cleansing agent. The accompanying Table shows the surface tension of the new fluid as compared with other solutions. Figs. 1 and 2 show the relation of contact resistance and immersion time for typical gages of alclad sheet used in the aircraft industry. It should be noted that etching time indicated on these graphs applies to *detail* parts of alclad only. Assemblies consisting of dissimilar alloys such as duraluminum and alclad are etched for a maximum time of 10 min. only. This is because the grayish-black film which forms on duraluminum surfaces after longer immersion cannot be readily removed from the interior of the faying surfaces. On detail parts, on the other hand, the

LEFT

FIG. 3—Rinsing etched assemblies in agitated water at room temperature. The lead-lined etching solution tank is to the left of the rinse tank.

o o o

BELOW

FIG. 4—Air blast drying of cowl segments after water rinse prior to spot welding.

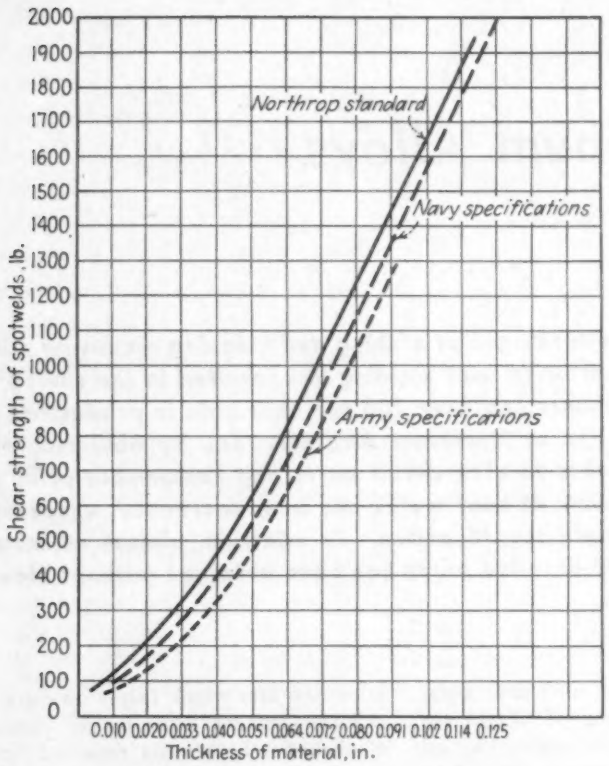



FIG. 5 — Minimum spot weld shear values for 24ST alclad.

## Surface Tension Chart For Cleaning Solutions

| Material | Specific Gravity | Capillary Rise, cm. | Surface Tension Dynes/sq. cm. |
|---|---|---|---|
| Water | 1.00 | 8.83 | 71.8 |
| Recommended alkali etching solution | 1.05 | 13.9 | 119.0 |
| Wetting agent (1% Nacconal solution) | 1.01 | 5.75 | 47.0 |
| Northrop spotweld solution | 1.22 | 4.15 | 41.2 |

spot welding by the wearing of neoprene gloves, thus avoiding contact of the work with the hand and consequent fingerprints.

### Laboratory Supervision

The variables in the procedure are very carefully controlled by means of laboratory supervision in order to maintain uniformity at all times. Titration tests, made biweekly, make it possible to keep the etching fluid concentration at the correct level. Under normal operating conditions, impurities are removed from the solution at two-week intervals by pumping the liquid through a cartridge con-

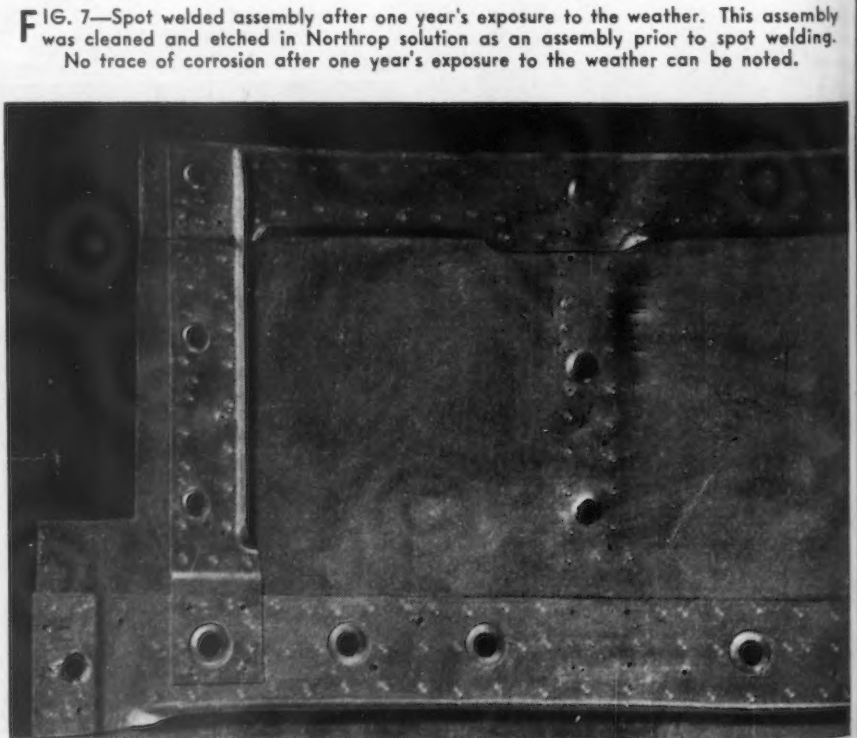
FIG. 6—Photomacrographs of spot welds taken at various stages of production runs, illustrating the consistency of quality obtained with the Northrop etching method. Left: After 500 welds; Middle: After 400 welds; Right: After 11,500 welds.

appearance of this grayish-black film is used as an indication of the completion of the etching process. This film is removed by hand wiping before the parts are rinsed.

Preparation for spot welding assemblies begins in the jigs where the detail parts are assembled, drilled and held together temporarily with Skin-Tights or Cleco fasteners. From the jigs the assemblies go to the etching solution which is contained in a lead lined tank, Fig. 3, and is operated at room temperature. As indicated above, assemblies are not treated longer than 10 min. while detail parts are allowed to remain in the bath until the grayish-black film appears. When the combined etching and cleaning operation is finished, the etched parts are thoroughly rinsed by plunging them into an air-agitated water tank at room temperature. After rinsing, assemblies or detail parts are placed on a drier, Fig. 4, which evaporates the moisture through circulation of air at room temperature.

Parts so treated are entirely free of foreign substances and are ready to be spot welded. Cleanliness of the surface is maintained throughout the process and up to the time of actual

FIG. 7—Spot welded assembly after one year's exposure to the weather. This assembly was cleaned and etched in Northrop solution as an assembly prior to spot welding. No trace of corrosion after one year's exposure to the weather can be noted.



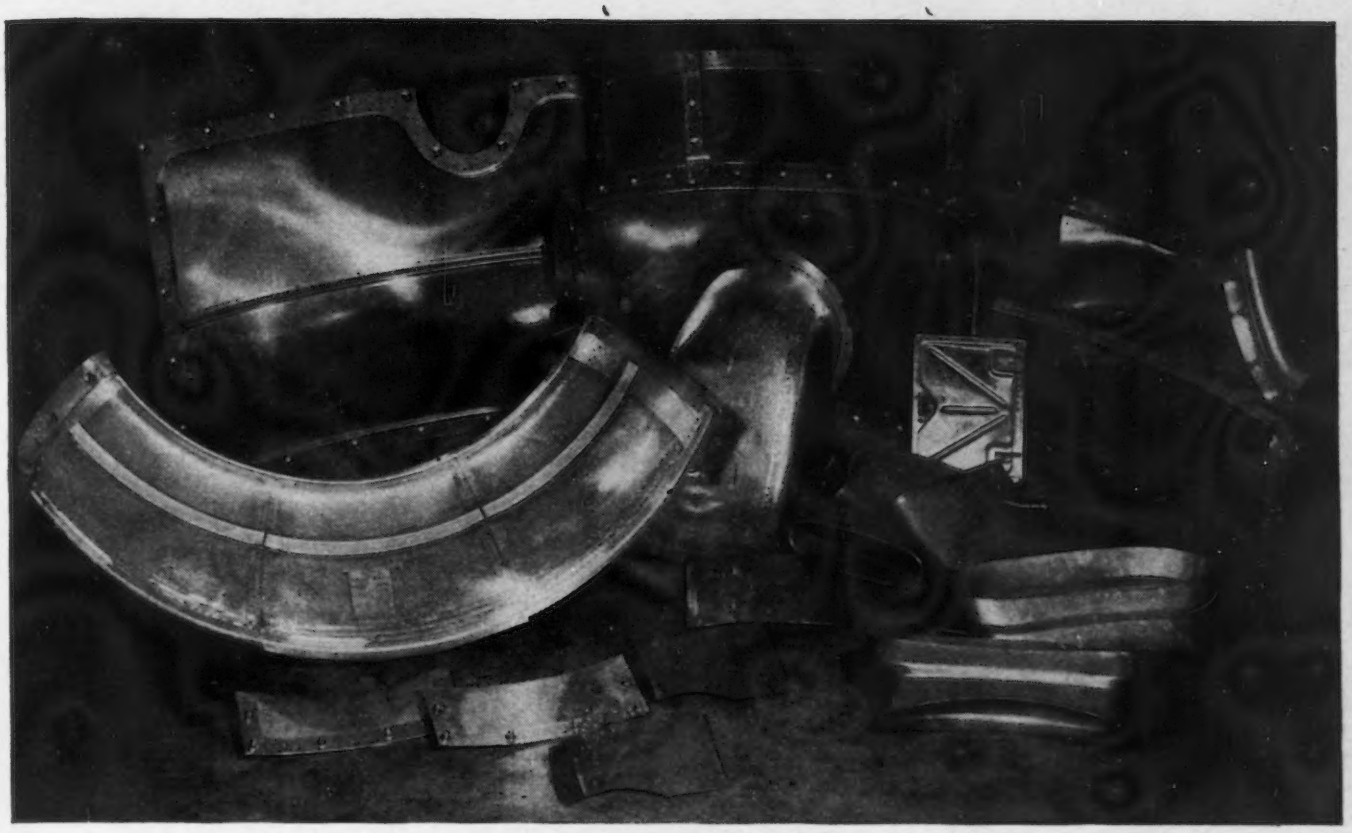


FIG. 8—Some spot welded assemblies that are typical of Northrop operations, which indicate the type of work that is being cleaned in the assembled condition prior to spot welding.

taining sawdust and excelsior, somewhat similar to an automobile engine filter. This device removes not only solid particles but grease and oil as well.

Consistency of results is checked periodically to make certain that all phases of the process are being applied properly. Specimens are taken from production at regular intervals to establish shear strength values in a standard button pulling machine. As indicated in Fig. 5, minimum shear values at Northrop are higher than called for on either Army or Navy specifications. On a recent investigation of spot weld consistency covering work done on 10 different spot welding machines, the following results were obtained:

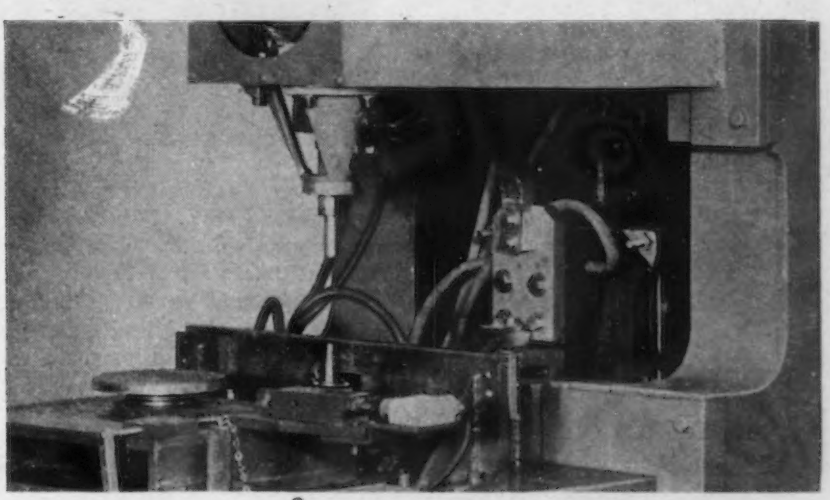
| Variations from Respective Averages | Percentage of Welds |
|---|---|
| 5% of mean | 67 |
| 10% " " | 27 |
| 15% " " | 4 |
| 20% " " | 2 |
| | 100 |

All shear values exceeded Air Corps specifications.

Consistent quality of welds is shown by the macrophotographs in Fig. 6. Besides obtaining good consistency of welds, almost unlimited production runs of detailed parts have been obtained without cleaning the electrodes. More than 15,000 spot welds, for example, have been made consecutively without electrode cleaning being necessary. Approximately 25,000 spots have been run in 7½ hr. with only occasional electrode cleaning as a precautionary measure.

Culminating two years of research, these data reflect knowledge of the practices which have proved to be of greatest value in accelerating Northrop's production program. Full procurement data on the material for the etching solution will be furnished upon written request to the process engineering department, Northrop Aircraft, Inc., Northrop Field, Hawthorne, Cal.

RIVETING with a welder: An ingenious adaptation of a resistance welder is in the riveting of stamped assemblies. The machine, developed by Progressive Welder Co., Detroit, hot-upsets and rivets in place the vanes of hydraulic flywheels. The ends of the vanes stick through holes in the faces of assembly rings. The "electrodes" are brought down under pressure against them, heating and at the same time upsetting these ends to rivet the parts securely. Table indexes automatically between riveting. The right amount of heat is obtained by means of conventional welding timers combined with a lower current density than would be used for welding.

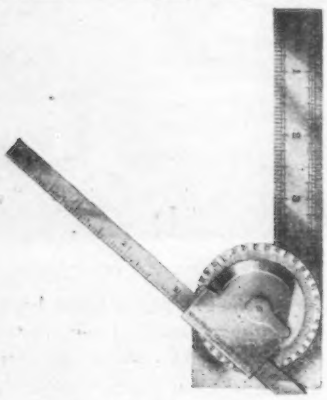


# New Equipment . . .

## Small Tools

***. . . Recent developments in gages, comparators, gear testers and other measuring devices are described in the following pages:***

A PROTRACTOR which is light in weight, thin and can be carried in the pocket has been put on the market by *Industrial Engineering Co., Inc.*, Board of Trade Building, Chicago. It is claimed it will measure directly any surface angle, such as is ground in tool bits, without the aid of any attachments. It will measure the taper on shallow blind holes or tooth angles on broaches. The degree graduations are arranged so that the component angle can be read directly as well as the angle required, and the sliding arm has also been graduated so that the exact depth of holes can be measured.



### Gage Block Case

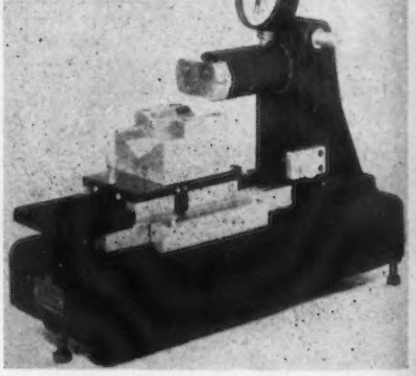
THE new case for Doall precision gage blocks designed by *Savage Tool Co.*, Savage, Minn., is only one-fourth as large as the conventional type gage block case, yet it holds 81 precision gages arranged for easy removal and selection. Each block is placed at a slight angle in the case so that the etched size marking near the top of each block can readily be seen at a normal viewing angle. The box is constructed of kiln dried solid walnut, properly treated to insure against acidity from the wood affecting the highly polished surfaces of the gage blocks.

### Precision Measurer

AN instrument for precision measuring of both internal and external dimensions held to very close tolerances has been developed by *the Sheffield Corp.*, Dayton, Ohio. As an internal dimension comparator, the instrument can be used for checking master and working ring gages, for setting snap and length gages and for other similar high precision work. It will check diameters or other internal dimensions from ¾ to 12 in. and explore a hole to a depth of 3 in. When used as an external comparator it will check rounds, straights and tapers within a maximum dimension of 12 in. The gaging arms are raised and lowered between 3-in. range limits by an electrical mechanism operated by two pushbuttons. A direct-reading visual counter, graduated in 0.01 in., serves as an automatic height indicator. The exclusive electric gaging head provides 2500 to 1 magnification. The scale of the Electrigage has a range of 0.0012 in. and is graduated in 0.000050 in.

### Internal Air Gage

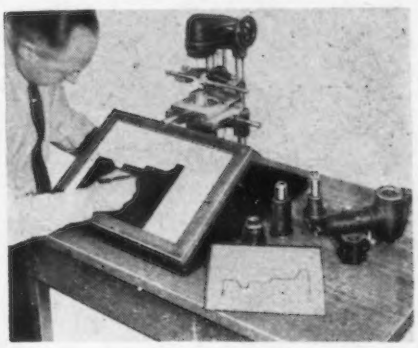
THE Air-O-Limit bearing gage has been developed by *Pratt & Whitney, Division Niles-Bement-Pond Co.*, West Hartford, Conn., to inspect inside diameters for straightness, roundness and size. The gaging fixture mounts the gaging unit and a ball-supported work carriage that positions the part over the gage plug. One V-type anvil with T. C. insert is permanently mounted to receive master ring gages while another accommodates the work. All master ring gages are of the same external diameter and the internal diameter is made concentric with the outside diameter to close limits. The filtered and regulated compressed air from the air-control cabinet is fed into the rear of the unit, passing through a restriction tube to two orifices placed on opposite sides of the gage plug. The air



gap restricts free flow of air from the orifices and the back pressure is calibrated in terms of "tenths" on the indicator dial. Use of two orifices permits a spot reading at any plane.

### Projector Comparator

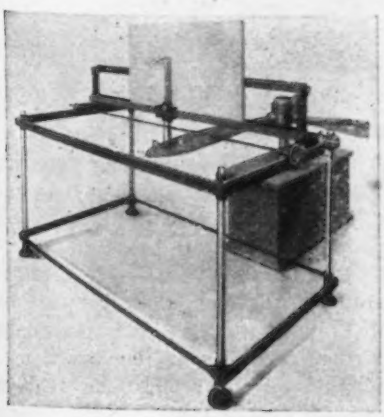
A NEW model Wilder projector containing a 2-in. diam. condenser (formerly 1½ in.) has been



placed on the market by *George Scherr Co.*, 128 Lafayette Street, New York 13, and is available in magnifications of 10X, 20X, 31¼X, 50X, 62½X and 100X. The diameter of the 10X lens is 1⅜ and that of the 20X is 13/16 in. The 2-in. condenser lens provides a larger beam of parallel light, permitting the use of larger lenses in the lower-power series.

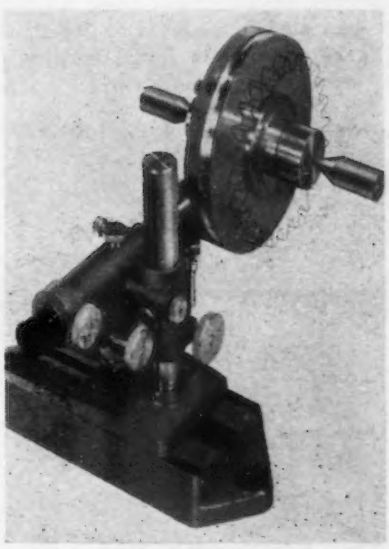
### Device for Duplicating Contours

A DEVICE to ascertain the exact contour of irregular surfaces has been placed by the market by *Inter-Lakes Engineering Co.*, 502 Transportation Building, Detroit 26. The Dupligraph transfers on transparent paper the exact contour of the irregular object, such as a propeller blade. It will also transcribe directly on metal. Concave readings in forming dies which frequently cannot be checked with ordinary templates may be secured, as may also the amount of spring-back and warp on a stamping.



### Circular Division Tester

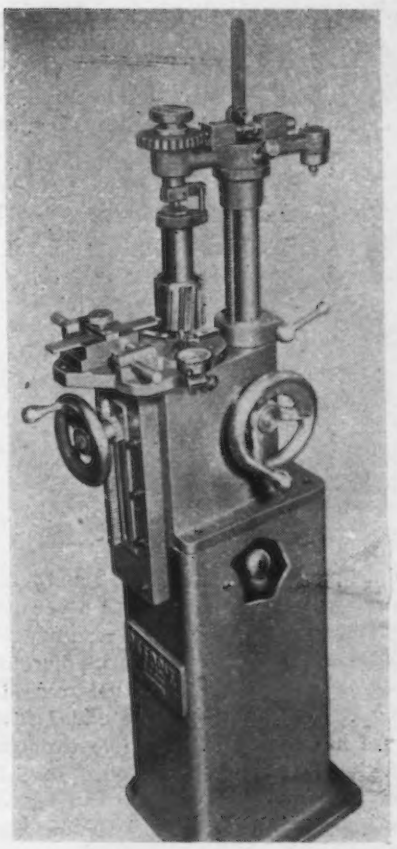
PRECISION circular division testing equipment is being introduced by *Engis Equipment Co.*, 310 South Michigan Avenue, Chicago. A master circle is attached to the part to be checked and is centered in its mount by two radial adjusting screws in conjunction with a precise dial indicator held against a groove around the periphery of the master circle. This groove is adjacent to a silver band graduated to 10 min. and numbered every degree. The circle mount has a bore of 2 in. diam., which may be reduced to 1 in. according to the size of arbor used. Rack and pinion motions are used for the microscope mounting to facilitate setting and



focusing in relation to the master circle. Each complete reading is obtained within the eyepiece of the reading micrometer.

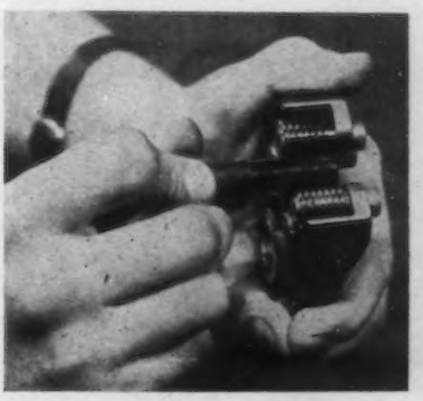
### Universal Hook Checker

A UNIVERSAL hook checker for checking hook or rake angles and flute spacing in sharpening thread milling cutters up to 6½ in. o.d. has been announced by *Detroit Tap & Tool Co.*, 8432 Butler Avenue, Detroit 11. Visual alining of a ground straight edge with the face of the cutter flute against an illuminated background permits reading the offset distance directly from an integral micrometer barrel. Placement of an indicator finger against the cutting face enables any error or flute spacing to be read directly on an integral indicator dial. The measuring assembly in which the ground straight edge finger and the indicator are mounted is provided with a vertical adjustment controlled by a handwheel. The two micrometer barrels which control the movement of the straight edge are calibrated to measure the offset distance from a radial line. Directly beneath the straight edge is a diffusing glass background. The spacing indicator and its finger are positioned to measure any error of cutting face spacing by comparison with the spacing of a master index plate.



### Thread Roll Snap-Gage

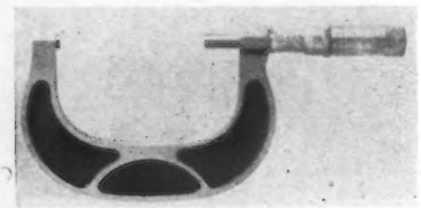
A COMBINED "Go" and "No Go" limit gage for rapidly checking male threads to both maximum and minimum limits in one operation has been put on the market by the *Sheffield Corp.*, Dayton, Ohio. It consists of a frame in which two sets of gaging rolls are mounted, each being free to rotate. One set represents the



"Go" limit, the other the "No Go." The gages are furnished standard for American National form, coarse and fine series. Wear is minimized because the rolls turn freely. They may be reground repeatedly.

### Vernier Micrometer

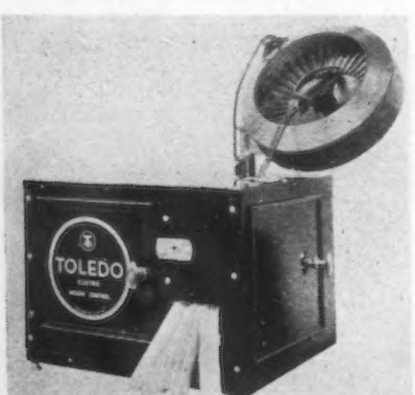
*THE George Scherr Co.*, 128 Lafayette Street, New York 13, has announced that henceforth all



Reed micrometers in the 1, 2 and 3 in. sizes will be furnished with a vernier enabling quick and easy readings to 0.0001 in., at the same price heretofore asked for Reed micrometers reading in thousandths. This added feature has been made possible through the use of a precision rolled thread on the spindle screw. Thread rolled is fast and lead error is held to a minimum.

### Dynamic Classifying Device

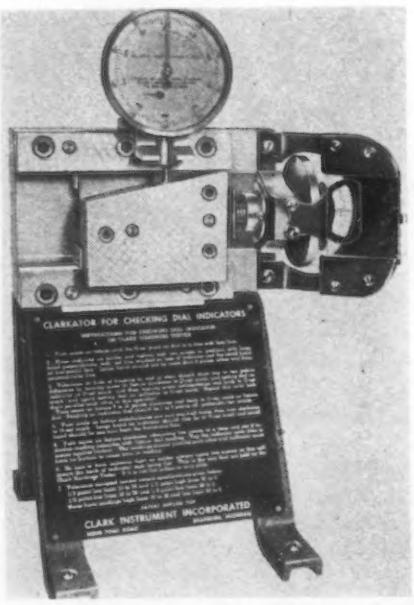
FOR automatically classifying and sorting 0.30 and 0.50 caliber armor piercing bullet cores and 20 mm. shells, a dynamic classifying device has been introduced by *the Toledo Scale Co.*, Toledo. Pieces to be weighed or classified must be of such a character that normal variations in weight do not materially affect the position of their center of gravity. Spheres, cylinders, rectangles and similar regularly formed parts weighing from ¼ to 8 oz. can be handled at speeds of 35—40 pieces per min. Parts are poured into the drum on top of the device and automatically deposited on the end of a lever, the loaded end of which is released, permitting it to




fall. Parts are weighed in motion, and the interception of a light ray by the weigh beam causes a photo-electric cell to operate the mechanism for automatically discharging the parts into one of three chutes, which classifies them as underweight, within-tolerance or overweight. The radial plate at the bottom of the drum is rotated by motor. The device is also available in semi-automatic models.

### Dial Indicator Tester

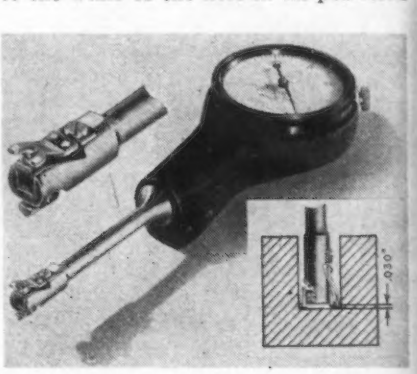
A DEVICE for checking the accuracy of dial indicators, the Clarkator, announced by *Clark Instrument, Inc.*, 10200 Ford Road, Dearborn, Mich, employs the sine bar principle, checking against the tangent of the angle. The indicator to be tested is mounted on top of the Clarkator with its spindle resting on a lapped angle block, which is ad-




vanced or retracted by a screw. Reading of the dial is by means of a mirror, enabling it to be seen together with the indicator. The front angle is used when checking standard indicators, each revolution of the screw equalling 0.020 in. and each point on the dial 0.002 in. The back angle provides a direct method of checking hardness tester indicators, each revolution of the screw equalling 0.01962 in.

### Blind-Hole Gage

MODEL NO. 1201-P-20 blind hole type of gage, manufactured by *Federal Products Corp.*, 1144 Eddy Street, Providence, enables one to explore the inside diameter, out-of-roundness, taper and other conditions of a hole down to within 0.030 in. of its bottom. All moving parts in the gaging head are spring-suspended. Two auxiliary locating contacts centralize the measuring contacts diametrically across the center of the hole. A slight rocking motion is required to locate the contacts at right angles to the walls of the hole in all positions



except at the bottom of the hole. Gage measures the diameter direct and can be easily set to a master, gage blocks or a micrometer.

### Profilometer

*THE Physicists Research Co.*, 343 South Main Street, Ann Arbor, Mich., has introduced the Type Q profilometer, which is lighter and smaller than former models. Storage compartments are provided for various accessories. The meter panel is set at a 45-deg. angle, permitting easy reading of the meter. The tracers are all adjusted to the same calibration number. It is designed for use on 115 or 230 volt 50-60 cycle power lines.

### Glass Surface Plate

A SOLID plate glass surface plate has been perfected by the *Cadillac Glass Co.*, 900 West Cermak Road, Chicago. Details and data may be etched on the underside. As it wears, the glass shows only scratches which do not burr. The plates do not require oiling or demagnetizing, and their accuracy can be readily checked. Cost is low.

# *This could have been the greatest bottleneck of all!*

Materials-handling is no longer a mere matter of "carry and dump" but, an efficient modernized streamlined system . . . contributing heavily to the sharp increase in industrial production. In War Industries and Civilian Production the battle of producing has developed into a "war of movement."

Right in the vanguard of this movement are those fast-moving, powerful, battery-powered electric industrial trucks . . . driven by sturdy Exide-Ironclads. Faster loading, unloading, and load shifting can now be done with less waste of manpower. Women can handle jobs that called for husky men under the old procedure. Exides have long been known for their dependability, durability, and ease of maintenance . . . and by helping to shorten the training periods of new workers . . . saving materials through long life . . . they are doing a big job and doing it well.

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● **MORE POWER, MORE PRODUCTION:** An Exide-Ironclad delivers its power at uniform voltage to assure constant hauling speeds. There is always a giant surge in reserve when an Exide powers your battery propelled vehicles.

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**DELIVERIES** Despite wartime conditions, we are quite sure that we can make deliveries to meet your requirements.

# Assembly Line . . .

STANLEY H. BRAMS

**• Post-war planning goes into more solid stage as some auto companies place orders with machine tool makers and plan revised plant layouts . . . Surplus tools continue to pile up in wake of completed war contracts.**

DETROIT — While darkening piles of surplus tools from canceled and completed war contracts mount higher in government warehouses, the automotive industry is making constantly more concrete plans for resumption of civilian manufacturing. Detroit expects a go-ahead from Washington soon after the European war ends. And it should be reported that sentiment in the auto city is definitely optimistic on the war's progress: belief is that the end is coming in Europe before the winter is out, quite possibly before the end of this year.

Machine tool circles report that General Motors is sending out men who are discussing in fairly complete detail their company's reconversion requirements. G. M. is putting actual orders for machine tools in the hands of a number of firms, probably with an eye to having the most favorable position possible on the order books. The other two major manufacturing units of the industry are making inquiries, but do not appear to have placed actual orders as yet. Some few parts makers have also been contacted for post-war discussions with motor car representatives.

Conversations indicate that General Motors expects to spend for reconversion tooling perhaps 10 times the average usually earmarked for year-to-year model changes. This seems due to the fact that the company has a substantial quantity of equipment out of its plants at this time, either directly sold to other arms plants, or on account of Lend-Lease, or on domestic lease. The company is counting on the return to its plants of comparatively little of this machinery, at least little in usable condition. Further, much equipment still at hand was so modified in conversion to war work that it is not economically feasible to reconvert it to its original purposes. It will be replaced.

Many machine tool companies, by and large, have idle facilities today which can be used to start the work cycle on such new orders. Planning, designing and some engineering can be done, even though actual manufacturing of the requirements cannot be started as yet. Inasmuch as the machine tool builders, by and large, can take on pre-production work, due to the virtual end of machine tool ordering for war, they are happy indeed to see such programs begun.

The amount of orders placed thus far cannot be estimated, but they are very likely well into seven figures and will go steadily higher between now and the end of the year. At least one of the smaller companies is paralleling the G. M. course in entering orders on a number of machine tool books.

In this respect, it should be noted that General Motors President C. E. Wilson urged a congressional committee last week to permit actual manufacturing of machine tools to begin now. His viewpoint was that the war's steel requirements now appear to permit some allocations for that purpose. He pointed out that the sooner machine tools can be made available, the sooner can industry begin civilian production.

Meanwhile, other activity is taking place within all the automobile companies. They are carefully checking over their plant layouts, with a view to determining how much equipment will have to be moved out, and where. Some companies which went sled-length in making over their plants for war production will be able to start out with literally a clean floor, once the changeover signal is given. As result, these will most likely have operations of efficiency all but impossible to achieve through normal and gradual year-to-year changes.

GENERAL MOTORS has already announced that it anticipates post-war business at least 50 per cent better than normal levels. Other companies are likewise planning on gains in this proportion, and are shaping their reconversion programs to handle this added business. More unified flow of materials, then parts and components, will be necessary to achieve the output goal.

Few, if any, of the automotive concerns are figuring on immediately making automobiles in DPC-owned plants which they are operating. Undoubtedly, minor thinking is being centered on the possibilities of utilizing such space. But these plants are now filled with government machinery which will likely be left there for the time being, rather than shipped to arsenals, as industry hopes will occur in the case of DPC equipment in private plants. And there is an obvious likelihood of delay in negotiations seeking to transfer such plants to private hands. In the face of these two considerations, the auto plants are expecting to utilize their own facilities in order to get out cars in the quickest possible time.

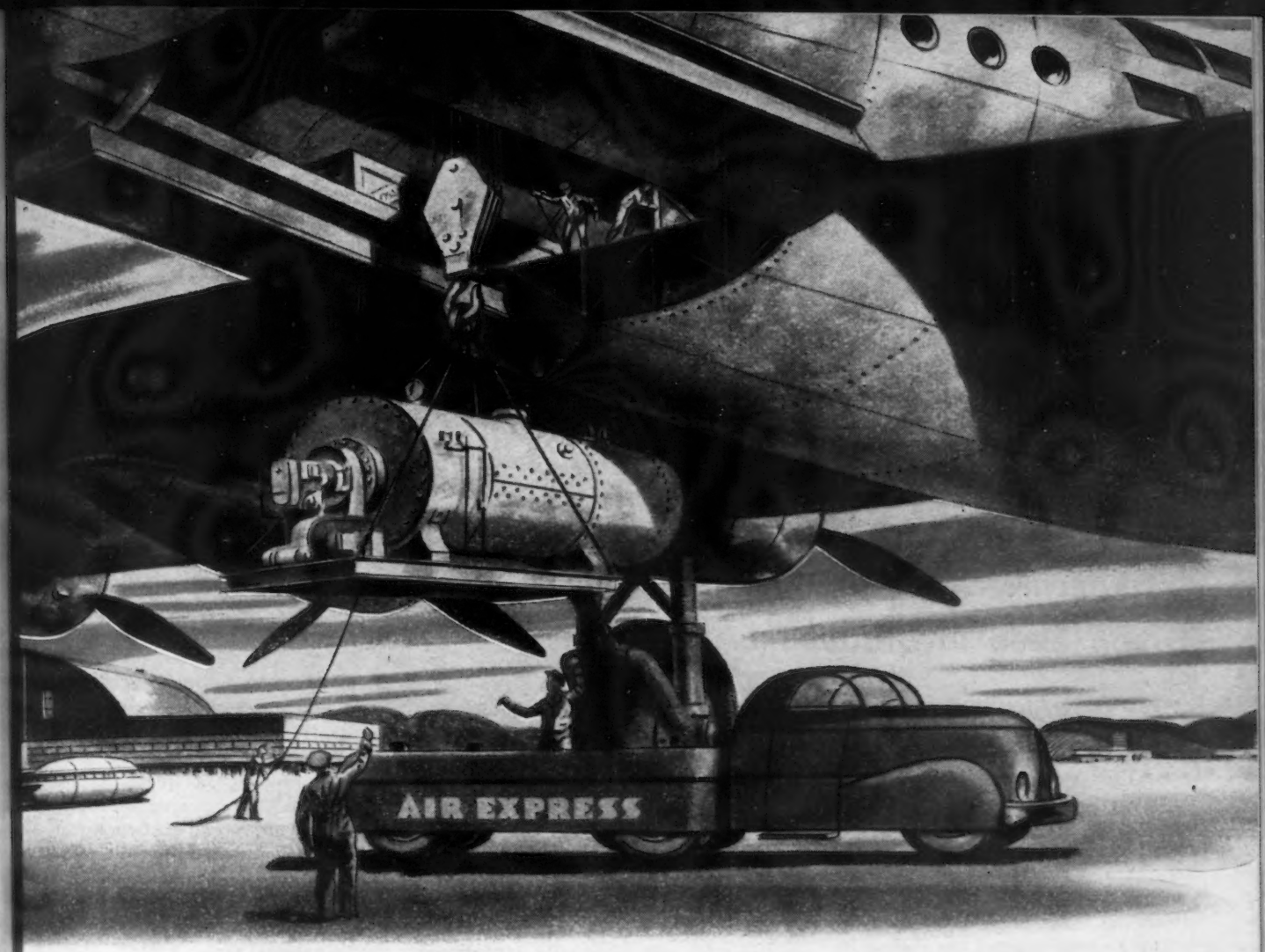
Individuals, meanwhile, are leaving the government posts in increasing numbers, in Detroit as in Washington. The resignation of D. J. Hutchins, Detroit regional director since September, 1942, has been announced; he returned to his former post as head of Firestone's sales activities in Detroit. His deputy director, A. C. Ryan, also resigned to re-

## *Long Range Fighter Given Test Flight*

*Cleveland*

**• • • A new long range fighter plane, product of General Motors, has had its first test flight.**

**Development of this plane from drawing board to prototype now in the air has established somewhat of a record for speed. Further records appear definitely ahead, for this prototype is not one which was hand built and which will be dissected and rebuilt before production orders have been given. Like the P-39 and P-40, this pilot ship is the first one off the production line, and will be followed by other mass-produced units.**




# Deliver Tomorrow To Karachi, India!

***. . . Made Possible by Machine Tools!***

Global war has demonstrated the practicability of air transport of troops, guns, tanks, food, munitions.

Global peace will see the development of hemisphere-spanning air freighters and passenger carriers to a degree far beyond anything we have known.

World-circling cargo planes — picking up or dropping off freight at principal cities en route — are more than probabilities. Four or more tons of cargo per plane will not be unusual loads for these flying box cars. "Ship RUSH via AIR" will be frequent even for products as bulky and heavy as a huge steam boiler.

Thus out of lessons learned in the hard school of war, springs a benefit for all mankind.

We at Kearney & Trecker look forward to the day when the machine tools we build can again be used to make such things for peacetime use — things that mean comfort, convenience, and better living for America and all the world.

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turn to industry. Others of lesser prominence in the Detroit office have heard the siren calls of private enterprise and taken their leave.

Last weekend's resignation of R. L. Vaniman, chief of the Automotive Division of WPB in Washington, is another straw in the direction of reconversion. In Detroit Mr. Vaniman's resignation was interpreted to mean that the war period controls over the automobile industry were about to give away to reconversion planning and reconversion controls.

Meanwhile, Army contracts continue to be canceled, and surplus tools are piling higher. Last week Ordnance distributed a long list of spare tools and machine parts which evidently accrued as a result of completion of a program at the Ford Motor Co. Highland Park plant. This long catalog of spare parts appears to include around 65,000 pieces, with a value close to $200,000.

o o o

# *Internecine Strife in World's Largest Union Seen in Studebaker Controversy*

By CHARLES POST
*Chicago District Editor*

***Chicago***

• • • **Production reportedly** plummeted last week at the Chicago plant of Studebaker Corp., Aviation Division, while the Chicago *Tribune* and the Chicago *Sun* fought an epic front page battle as to whether the plant's union was Communist dominated.

The *Tribune* started the ruckus by charging that the union, United Auto Workers Local 998, was throwing wrenches in the production rate at the instigation of the Reds. The *Sun* popped back that the charges were part of an anti-union plot. The workers dropped their tools to join in the hair-pulling.

The Studebaker management, caught in the middle, pointed to the plant's record of meeting all schedules, winning an Army-Navy "E" and star, and reducing costs 28 per cent since March. The Army Air Corps wrung its hands as the workers stopped to debate the matter.

Behind the smoke thrown up by the daily press lies a story of internecine strife within the world's largest union, a war of principles and personalities. The CIO United Automobile, Aircraft and Agricultural Workers of America, usually abbreviated UAW-CIO, recuperated from a nearly fatal split in 1939 which thinned its membership to 10,000. Until just before Pearl Harbor, it had 605,000. Today, swollen with a flood of recruits from aircraft and engine plants, membership stands at an announced 1,078,000. By Christmas, new bargaining units can well bring the figure to 1,225,000. With a minimum of hard bitten labor union tradition, the UAW has absorbed the conglomeration of elements recruited to mass produce war implements.

**From the beginning,** the union labor nucleus, preaching that the war "must not be used as an excuse to vitiate the hard-won gains of organized labor," has analyzed all proposals on the basis of their long-term effect upon the labor movement. The memory of this group dates back to the time when Homer Martin led all but 10,000 of the union's 400,000 members out of the CIO and eventually into the AFL. Branding this action a sell-out of organized labor, the veteran labor clique today is determined that fundamental labor objectives—higher pay, job security, voice in management—shall not be sacrificed for expediency or philosophical dialectic. Stocky, red-headed Walter Reuther, whose background in the automobile industry—and who won headlines for a plan to convert the industry to war production, is the rallying point of this group. He is vice-president of the UAW.

Bitter vial of Reuther and jealous of Reuther's intrenchment is ambitious, backslapping Secretary-Treasurer George F. Addes, whose office gives him an unexcelled opportunty to greet new locals at the door. His political health dependent on war-babies, it currently comes easily to Addes to plump for all-out war production. Opportunely, the war and labor scarcity can be used as effective crowbars to raise desperate management from the swivel chairs and ease in the men with overalls. A full-bellied rank-and-file, making more money than ever before, does not spur its leaders to immediate strong demands. If too much hell is not raised now, the union can put itself in a position to dictate rather than plead when jobs are scarce and times hard, the Addes steering committee reasons.

This makes sense to the newcomers, well-paid now and fearful for their jobs later. It fits in even more beautifully with the party line of the Communists, the only militant, organized group upon whom Addes can draw for support.

Because of the large number of rookie members, both factions have a difficult time drawing their battle lines, and preventing guerilla excursions once they are drawn, as was manifested at the UAW's 1943 convention at Buffalo in October. Among the cocky, happy-go-lucky rank and file, election as a convention delegate is a plum far more to be desired than the heavy responsibility of being an officer or executive. The Communists feel the local union officerships wield more power in the long run.

Incentive pay has been a fundamental issue since it was set up in an executive order by President Roosevelt as a means of thawing the wage freeze provided its introduction would not raise unit costs or stiffen the price structure. Mindful of the "speedup" of days gone by, Reuther will have none of it. He wants pay stabilization on a national scale, so that industry, with a choice of plants after the war, will not concentrate in low cost labor areas. The usual CIO incentive pay plan which recommends that the sum of savings through lower unit production costs shall be divided among all workers evenly (none for management) is right up the alley of certain officials both from the standpoint of principle and helping speed production. The WPB labor production division has encouraged the plan as a stimulus toward greater production, which indeed it has proven to be. The convention supported Reuther in distrust of incentive pay.

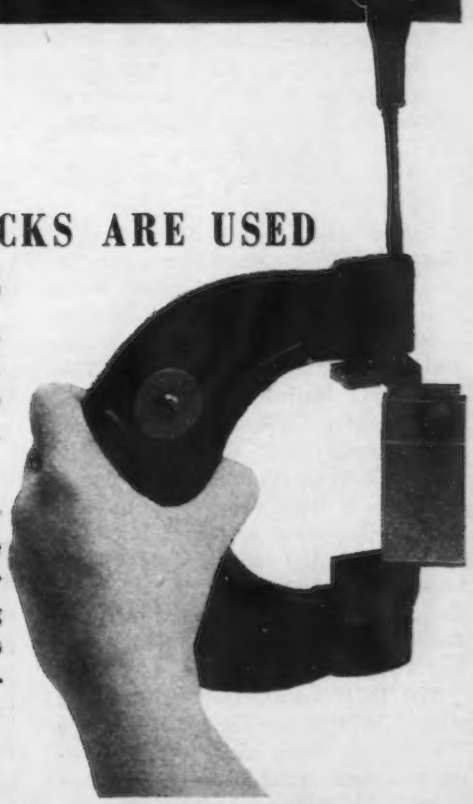
Next to the United Mine Workers, UAW locals, particularly those heavy with Reuther followers, have shown a greater disposition to treat lightly the "no strike" pledge than any other segments of organized labor. Top leadership in the UAW, Reuther, Addes, and President R. J. Thomas alike, outwardly support the "no strike" pledge, using it as an effective weapon to force the scrapping of the "Little Steel" formula or, if such is possible, a rollback in prices. Sporadic unauthorized strikes serve to jangle this saber, of course. At the Buffalo convention many delegates thought it was time to uncase the saber, but both organized groups were more temperate.

# THE USEFUL, ACCURATE LIFE of Standard Gage Block Sets *Increased Many Times Over*

## WHEN *Carblox* CEMENTED-CARBIDE GAGE BLOCKS ARE USED AS END BLOCKS IN BUILD-UPS

**The greatest wear factor in the use of any gage blocks is caused by abrasion on the ends of the build-up. Carblox used on each end of a build-up will act as protective anvils and prevent wear on the less wear-resistant steel blocks.**

**Carblox, used to supplement standard sets of steel or chrome plated gage blocks will greatly increase the usable, accurate life of those sets now in use in your plant. In addition, the customary necessity of checking blocks can be largely eliminated, and scrap or rejections resulting from the use of worn gage blocks will be reduced to a minimum. Write for full information.**



ARMY (E) NAVY

**LINCOLN PARK TOOL and GAGE CO.**

LINCOLN PARK, MICHIGAN

# Washington . . .

L. W. MOFFETT

**• SWPC civilian production drive questioned . . . OCR sponsorship doubted . . . Move to prolong agency's life seen in recent moves.**

WASHINGTON—The hypodermic which was to be administered by Smaller War Plants Corp. to small manufacturers of civilian goods, with OCR supposedly acting as sponsor, has turned out to be nothing more than water. While it is expected to do no harm, officials closest to the civilian supply picture say it can do little or no good, and in most cases the SWPC check will be duplication of a job already done.

The original plan as announced by some SWPC regional offices was to check small plants to determine which could manufacture essential civilian products in the first quarter on special allotments of materials. This check was hailed as being directly sponsored by OCR, but OCR officials emphatically deny that this is the case. They say that SWPC is entering into a field which has already been well-covered, and that the various industry divisions in WPB in connection with OCR are fully aware of the manufacturing capacity of producers of civilian goods, both large and small.

The OCR sponsorship came about when SWPC asked for a list of some 700 civilian items which are now being produced under various limitation orders. OCR furnished this list, as requested, with a few changes.

This is the extent of OCR's sponsoring this survey of small manufacturers. It must be remembered that WPB was in touch with this situation long before SWPC appeared on the scene. It must also be remembered that SWPC cannot let contracts to these manufacturers and has no power to allot materials.

OCR officials point out that these 700 items will continue to be produced in 1944, as well as some additional items, but that the allotments will not be handled by SWPC. These officials are inclined to believe that SWPC is carrying on this work in an attempt to perpetuate their existence, and to get their hand into the reconversion picture.

THE fact that SWPC has attempted to prove its case before the House Small Business Committee in reporting its progress serves to bear out OCR's contentions. The Committee was sympathetic in its attitude but SWPC testimony only seemed to further the idea that the organization had reached the end of its usefulness.

The witnesses contended that they were hamstrung by WPB in their efforts to obtain prime contracts. When pointed out by the Committee that under the law SWPC had prime contractual authority the reason given for not exercising this authority was that SWPC hesitated to go after prime contracts unless the services didn't give them what they wanted.

SWPC officials also said that they had been denied places on the urgency and priorities committees by WPB. This indication that WPB, of which SWPC is a part, is not too vitally interested in the welfare of SWPC seems only to serve to minimize further the importance of SWPC. While not so intended it also served to support widespread public opinion favoring a sweeping demobilization of bureaucracy.

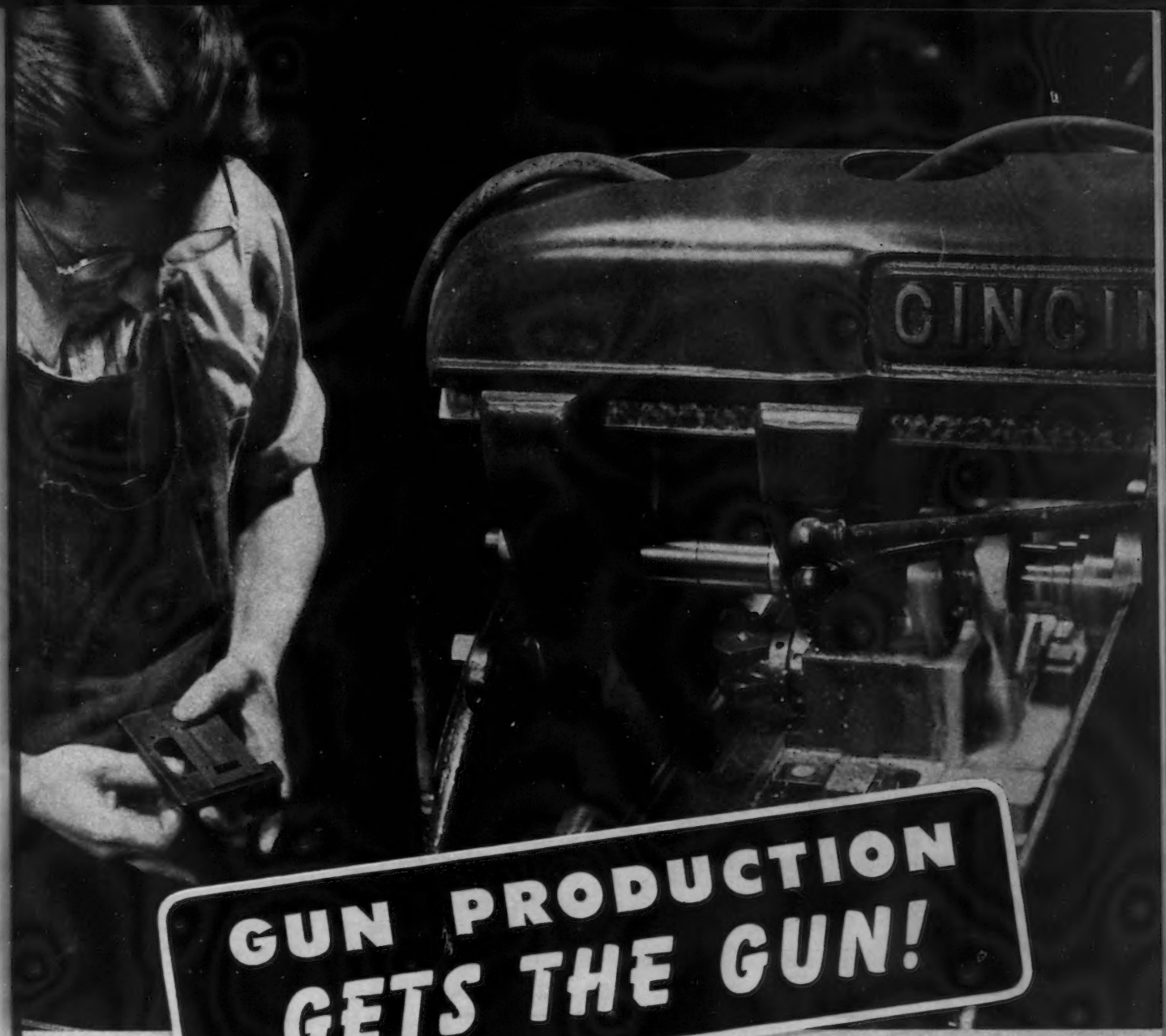
It was also admitted by SWPC that they had reached the limit of what they could do for small manufacturers in the war effort because of the change in military requirements and can do little more. This admission would account for their attempt to rise to the fore in the civilian supply picture. In relation to reconversion to civilian production SWPC feels that this work should start with the small manufacturers and work up, rather than opening up with the larger companies first.

The testimony showed a lack of proper coordination between the various sections of SWPC. After questioning by the committee it was revealed that approximately one-third of $3,000,000,000 worth of procurements placed with SWPC by the various agencies had been placed with small manufacturers. Time delays caused by lack of personnel was the only explanation offered for this. Practically all of the witnesses asked for an increase in personnel.

THE witnesses offered the following recommendations to the Committee as to what could be done to strengthen the organization:

1. Appointment of a chairman to

**VIVE LA FRANCE!: First fighting ship in this war to be turned over by the United States to the French Government was the *U.S.S. Senegalais*, shown as she was launched at the Wilmington, Del., yards of the Dravo Corp.**




# SUNOCO EMULSIFYING CUTTING OIL

## increases cutter life . . . improves finish . . . cuts costs

The accuracy and speed with which American manufacturers are turning out vital parts for automatic guns for our armed forces is a production marvel . . . and Sun Oil Engineers and Sunoco Emulsifying Cutting Oil have a part in it!

One large plant, recently awarded the Army-Navy "E" for outstanding achievement in the production of automatic guns, had been having trouble on an important milling operation. Production was not up to rated capacity and the entire schedule was threatened by this bottleneck.

On the recommendation of a Sun Cutting Oil Engineer — a Doctor of Industry — they changed from the competitive product they were using to Sunoco Emulsifying Cutting Oil. Sunoco solved their problem! It was stable in emulsion . . . increased cutter life . . . produced a better finish . . . and in addition there was a saving of 25% in cutting oil costs and operators' complaints about skin irritation ended.

In this way — in hundreds of other ways — Sun Doctors of Industry and Sun Cutting Oils are contributing to the production miracle that is winning the war. Let them help you in your plant . . . write . . .

**SUN OIL COMPANY** • *Philadelphia 3*
*Sun Oil Company, Limited, Toronto, Canada*

SUNOCO

**SUN INDUSTRIAL PRODUCTS** *HELPING INDUSTRY HELP AMERICA*

provide strong, aggressive leadership.

2. More effectual control in the letting of contracts.

3. Legislative aid emanating from the House and Senate Small Business Committees; in this they obviously would like Congress to give them a place in reconversion.

4. More sympathetic understanding and cooperation from WPB.

5. SWPC should be given a greater opportunity to exercise its functions by the various procurement agencies.

It was pointed out by officials charged with the responsibility of maintaining adequate civilian supplies that the interests of small business are taken into consideration when making allotment of materials, and that many of these smaller manufacturers have done much to maintain the civilian economy. In addition, the procurement agencies have let countless contracts to small business without the aid of SWPC.

OCR officials emphasized that even if the SWPC effort was conscientious, there could be no increase in production of civilian goods, since allotments for the first quarter of 1944 have already been made. Although if there were any excess materials, which is unlikely since OCR would take all it can get, SWPC might be given a chance to see what could be done about starting up production in whatever idle plants might exist.

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## Founders Hear Private Enterprise Plea

*New York*

• • • "We must restore to the fullest extent, private enterprise in this country," Senator Alexander Wiley (Wis.) proclaimed before the National Founders Association here recently.

"If we can keep our factories in full operation 40 hr. a week, and provide the employment that this activity implies, we will be producing a net national income of somewhere around $125 billion, as compared with $90 billion at the peak of 1929. Even allowing for the price rise which has occurred since then, we would still be in a very favorable position.

"We must take government out of business as quickly as possible after the establishment of peace, and provide the incentive to businessmen to go forward.

"Our tax structure should be such as to provide an incentive to people who have to invest so that money has a prospect of reward, without turning all the profits over to the government.

"Our unprecedented economic development is based upon this private free enterprise system, and that should be the target at which we shoot, the goal toward which we should strive.

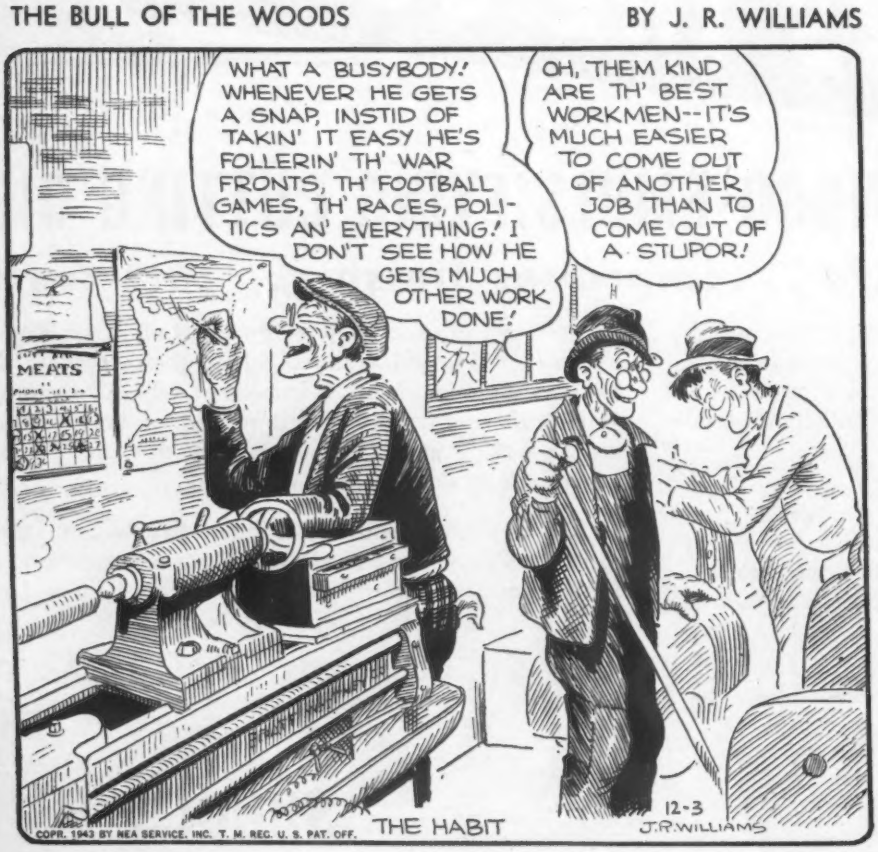
"We feel that our private enterprise system must be preserved. When the war is over, the government will have on hand approximately $50 million worth of goods and plants. These should be handled with extreme care. They should be disposed of in foreign trade, through American business channels, rehabilitation of foreign countries, and the balance distributed through regular business channels in this country. The government must not engage in distribution in the postwar period. Let business organizations do that. This is necessary, in order that we will not fall into a dumping program such as followed the last war. Wherever possible, plants should be turned back to private ownership, so that government will not extend its field of competition with business. Government competition means generally, special privilege for government owned and operated business and plants to the detriment of its competitors—its own citizens.

"At the end of this year the following industries will be owned, either outright or to a considerable extent, by the federal government.

1. The entire synthetic rubber industry
2. 90 per cent of the aviation industry
3. 50 per cent or more of the aluminum industry
4. 20 per cent of the steel industry, based on peace-time output
5. About one-half the machine tool industry
6. 8 per cent of the magnesium industry

"These percentages are based on the Reconstruction Finance Corp.'s ownership of 1500 or more war plants. When we take into consideration the tremendous future anticipated for the aviation industry, 90 per cent government ownership in that field is particularly significant. If this condition is permitted to continue, it means liquidation of our private enterprise system. And that, of course, means that the American way of life, will not even exist."

THE BULL OF THE WOODS — BY J. R. WILLIAMS


WHAT A BUSYBODY! WHENEVER HE GETS A SNAP, INSTID OF TAKIN' IT EASY HE'S FOLLERIN' TH' WAR FRONTS, TH' FOOTBALL GAMES, TH' RACES, POLITICS AN' EVERYTHING! I DON'T SEE HOW HE GETS MUCH OTHER WORK DONE!
OH, THEM KIND ARE TH' BEST WORKMEN--IT'S MUCH EASIER TO COME OUT OF ANOTHER JOB THAN TO COME OUT OF A STUPOR!
MEATS
COPR. 1943 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE HABIT
12-3
J.R.WILLIAMS

# Spotter for undersea raiders...

SEA LIONS beat their cousins, the seals, out of an important job during the early part of World War I. Both have a hoarse, barking voice. But sea lions have sensitive, external ears... seals do not.

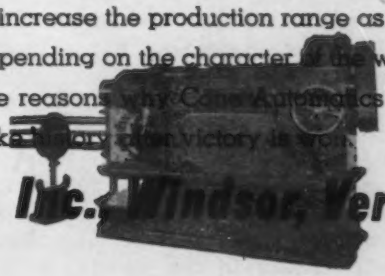
So sea lions got the job of detecting U-boats. They were trained to bark like fury whenever they heard the vibrations of an approaching undersea raider.

Today, there are many devices for detecting the approach of submarines, but none of them depends on animals. All either depend on machines, or they are constructed with the help of machines.

The heavy responsibility of these machines is illustrated by the fact that during the last war, German U-boats destroyed 5,408 vessels, or 11,189,000 gross tons of shipping. Today, Germany is building 20 submarines a month, each of which can potentially sink, on a single raiding trip, as many as 14 ships!

But this is only one of the wartime responsibilities of the machine tool industry. Our nation's production of airplanes, tanks, jeeps, anti-aircraft guns and munitions—all this stems from machine tools.

In wartime production, when speed is vital, the output of Cone Multiple Spindle Automatic Lathes is of especial importance. These machines can, in many operations, increase the production range as much as 10 times, depending on the character of the work. This is one of the reasons why Cone Automatics will continue to make history after victory is won.

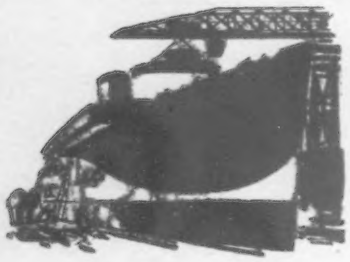


**CONE Automatic Machine Company, Inc. Windsor, Vermont**

# WEST COAST . . . .

OSGOOD MURDOCK

**• Older plants looking for bar and light shape orders as the only steel plant between San Francisco Bay and Puget Sound begs for a buyer . . . Approximately 150,000 tons of awkward steel in Coast surplus inventories for redistribution.**



SAN FRANCISCO — Sensitive to the nationwide reaction slackening pressure for carbon steel bars and light shapes, independent Pacific Coast mills have been actually shopping for orders, and in some cases furnaces and open hearths have been shut down. The plant of the Pacific States Steel Corp. at Niles, operating entirely on scrap in electric furnaces and good for 250 tons a day, was reported closed due to a labor dispute which may or may not tell the whole story. There was practically no backlog on the light staples which the older West Coast plants are capable of producing.

Whereas a year or even six months ago there would doubtless have been rather eager interest in the opportunity to take over at a bargain price the only mill at Portland, Oregon, a small electric furnace installation operating entirely on scrap in an area where scrap may be purchased for less than at any other point in the United States, these past few weeks there have been no takers. The Oregon Electric Steel Rolling Mills have been rather openly on the market. Representatives of at least four major steel producers have looked over the layout and laid low. The new plant is impressive in its general situation and was designed for an output of up to 200 tons a day. It was financed with an RFC loan of some $750,000 and an approximately equal investment by the Schnitzer interests, long factors in the Pacific Northwest scrap market through the Alaska Junk Co. After only a few months partial operation, the plant has been closed down for several weeks. Sam Schnitzer, one of the officials of the corporation, was locally quoted as follows: "We need $250,000 or $300,000 but could use as much as $500,000." Although there are two independent electric furnace operators and Bethlehem's five open hearths at Seattle, only 200 miles north, the sole Portland steel producer, up to this time, would seem an attractive bargain, especially to those zealous local apostles of the manifest industrial destiny of the Pacific Northwest who have been so ambitious for local, independent steel facilities. Here is a promising, well-situated nucleus to build on, a pitiful orphan to be had for a mere pittance, and no takers!

REVISED manpower requirements and anticipations for the coming six months in the southern California area have been made since the imposition of individual employment ceilings based on the highest number of employees for each plant during October. Before this ceiling freeze, employers estimated that they would require 67,000 additional workers by Jan. 1 and as many again by May 1. Stabilization and elimination of turnover since the ceiling and freeze has reduced these figures until now it is estimated 56,000 additional workers will suffice for the next two months and about 82,000 for the next six months. This includes selective service replacements.

Illustrative of the better labor utilization and the earnest effort of shipbuilders in Washington state to reduce their personnel 10 per cent as requested several months ago are the figures for nine major Puget Sound yards. On Aug. 31 they had an aggregate working personnel of 64,749, whereas on Nov. 15 the same yards have reduced their labor force to 59,762, approximately 5000 less workers and about an eight per cent reduction. But the Bremerton Navy Yard still needs 8000 new workers and Boeing wants 5000 for replacements and expansion within the next three months.

AS early desperation war contracts are cancelled or terminated, with facilities practically complete, and the emergency production program well jelled, the disposal of surplus materials comes progressively out into the open and up into the big brackets. Public procurement officials and private industry's purchasing agents and inventory control departments are convinced that WPB's Redistribution Division is well set up.

It is roughly estimated by the Pacific Southwest regional Redistribution office at San Francisco that between 75,000 and 100,000 tons of steel are now involved in its surplus inventory. It has 25,000 tons on its current surplus record. It is taking over approximately 25,000 tons more from liquidated Steel Recovery Corp. and it anticipates at least an additional 25,000 tons in the southern California aircraft surplus inventories when they are completely available. Whenever plates or staple merchant stocks appear, they move immediately, but much of the volume is off size and off specification. When a strenuous steel landing strip program was abruptly terminated a month or two ago, two West Coast plants were left with an aggregate of some 4000 tons of 3/16 hot rolled strip from ⅞ to 1½ wide and cut to various lengths up to 30 ft. After it had been bulletined to all WPB offices throughout the United States it finally found a market in South America. The biggest movement of steel directly reported so far through Pacific Redistribution channels was 4000 tons for the first two weeks in November, and all this represented awkward and otherwise idle inventory.

FOR the Pacific Northwest region with its office at Seattle there will be up to 50,000 tons additional surplus steel inventory when steel recovery and aircraft quantities are added to current Redistribution records.

All the southern California aircraft producers except Douglas and Consolidated at San Diego (incidentally the two biggest) have now compiled and filed surplus inventories and are keeping them constantly revised and up to date. Sales representatives are in the field with catalogs, but because of rating limitations so far unrelaxed, buyers are confined to Army, Navy and commercial distributors, who can now put even highly rated items in stock under PD 470.

Following the recent Chicago meeting of the national scrap processors advisory committee with WPB and OPA officials at Chicago, members of the trade have been ex-

MANY industries depend upon EX-CELL-O Precision Thread Grinders for production of accurately threaded hardened parts for war work. Outstanding is the aircraft industry. Aircraft engine manufacturers in the United States are using precision thread grinders for threading parts such as cylinder barrels, crankshafts, propeller shafts, crankshaft bearing bolts, connecting rod bolts, tappet adjusting screws, etc. . . . EX-CELL-O precision thread grinders are so dependable that what formerly would have been considered very delicate threading operations on aircraft engine parts are now handled easily, with assured accuracy, high finish, production. . . . EX-CELL-O precision thread grinders grind fine threads directly from heat-treated blanks and finish grind coarser threads after heat treatment.

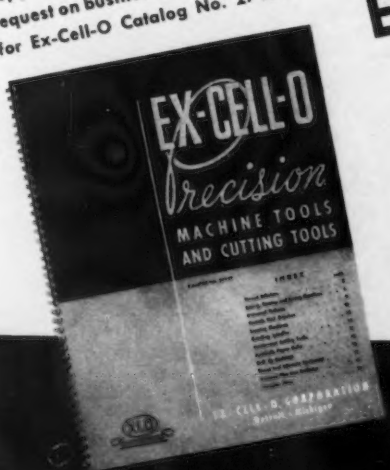
EX-CELL-O CORPORATION • DETROIT

"We finish grind these fine pitch threads from hardened solid blanks . . . on EX-CELL-O Thread Grinders!"

XLO

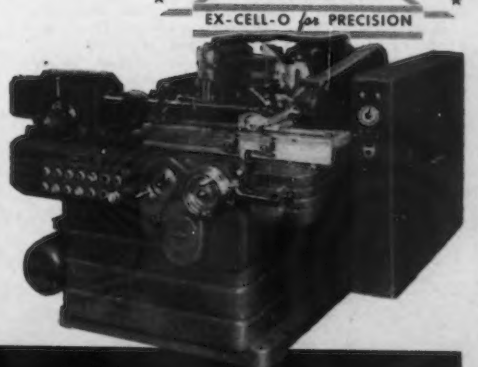
EX-CELL-O for PRECISION

Below: Ex-Cell-O's new catalog on precision machine tools, cutting tools, and other Ex-Cell-O precision products. Contains illustrations, descriptions, and specifications. A copy will be mailed free to any request on business letterhead. Ask for Ex-Cell-O Catalog No. 27121.




Extreme Accuracy In Form and Lead...*With High Production*

At Right: One of nine styles of Ex-Cell-O Precision Thread Grinders—Style 33 Automatic.



*Precision* THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS

pecting official announcement from Washington of revised schedules which will permit sufficient increase in permissible handling charge, particularly on cast scrap, to provide an inducement and restore this inactive and destitute market. Meanwhile, there seems little heart or energy in the WPB Salvage "drive" for Victory scrap piles on the Pacific Coast when, at the same time, Bethlehem buyers will purchase no scrap in less than carload lots, thereby eliminating former truck load deliveries, and Columbia Steel no longer purchases turnings.

o o o

# Briefly Told—

## Liquid-Cooled Aircraft Engine Industry to Be Developed in Australia

• Following the decision to construct heavy bombers in Australia, Prime Minister John Curtin announced that the Government also planned to develop the production of modern liquid-cooled aircraft engines. The engine development will begin with the production and maintenance of spares, and evolve progressively into turning out complete engines.

•

***• Bell Aircraft Corp. has started laying off some workers in its Buffalo and Niagara Falls plants in anticipation of a changeover to production of its new high-ceiling fighter plane recently announced by the OWI. The number laid off will total "several hundred," according to a company spokesman.***

•

• Closing of Milwaukee's $22,000,000 ordnance plant, which has been managed by the United States Rubber Co., involves distributing some 5000 employees, half of them women, into other industries. The government employment service is facilitating smooth and fast transfer of this manpower.

•

• Paul G. Hoffman, president of Studebaker Corp. and chairman of the Committee on Economic Development, told the New York Town Hall Forum last week that the nation's productivity in the post-war era must be increased by 30 per cent in order to employ 20 per cent more workers than normal. He set the post-war work force at 55,000,000, an increase, according to Hoffman's estimates, of 9,000,000 workers.

•

**• Eleven executives from the metal industries have been elected to membership in the Controllers Institute of America: Ralph H. Ackerman, Mid-States Steel & Wire Co., Crawfordsville, Ind.; Owen K. Bell, Soule Steel Co., San Francisco; Austin H. Bennett, Mississippi Valley Structural Steel Co., Decatur, Ill.; Warren W. Cowden, Andress Steel Co., Newport, Ky.; Lester M. Elliott, AGA Metal Tube Co., Elizabeth, N. J.; Albert B. Hetzer, Edwin B. Stimpson Co., Brooklyn; George H. Maslin, Jr., American Chain & Cable Co., Inc., Bridgeport, Conn.; Paul E. Newey, Ceco Steel Products Corp., Omaha; Herbert D. Rathbun, John A. Roebling's Sons Co., Trenton, N. J.; C. T. Redmond, Columbia Steel Co., San Francisco, and M. M. Rosenberg, American Smelting & Refining Co., New York.**

•

• A new "chin turret," mounting two 0.50-cal. machine guns, for the Flying Fortresses is now in volume production at Bendix Aviation Corp., South Bend, Ind.

•

***• At the second war time meeting of the Meehanite Research Institute of America in Cincinnati. Nov. 3, 4, and 5, the following officers were elected: President, Oliver Smalley, Meehanite Metal Corp., New Rochelle, N. Y.; vice-president, H. B. Hanley, American Laundry Machinery, Rochester, N. Y.; secretary-treasurer, C. S. Nichols, Meehanite Metal Corp., Chattanooga, Tenn.***

•

**• Western Electric Co., New York, in a recent report to the WPB and the SWPC disclosed that 50 per cent of its total sales of war materials to the government since the U. S. entry into the war had been produced by subcontractors.**

•

*• Average weekly earnings of workers in 173 Buffalo district plants rose to $50.84 during October, highest in history, according to the Buffalo Chamber of Commerce. In October, 1942, average weekly earnings were $46.21.*

•

• Absenteeism in Cleveland war plants dropped to a new low during October, according to the calculations of the Associated Industries. In the periodical survey of some 200 industrial plants in that area absences cut scheduled man days production by only 4.61 per cent.

•

**• The contract for locomotives for South America's first complete steel mill, in the State of Rio de Janeiro, Brazil, is being executed by H. K. Porter Co., Inc., Pittsburgh, which has shipped several steam locomotives already.**

•

• Increased use of Franklin aircraft engines in primary training planes was indicated recently when the Aircooled Motors Corp., Syracuse, N. Y., announced receipt of two new orders for engines of this type. One order was from the Brazilian government, and the other from the War Training Service.

•

***• In the face of naming Cleveland a Group I critical labor shortage area, it was announced by the SWPC that $5,000,000 worth of business, for factories and plants in this area with 500 or fewer employees each, has been obtained from one of the nation's largest companies.***

•

***• In the four-state Cleveland region of the WPB, there are now 672 production committees covering more than a million war workers.***

•

• J. I. Case Co., Racine, Wis., is expected to finish its production of wings for bombers next spring and shift to the manufacture of its peace time product, farm machinery.

**• Officials of LeRoi Co., Milwaukee, recently announced a retirement and pension plan for employees. The firm has set aside $220,000 for an initial deposit and will make further payments into the fund on the basis of employees' annual earnings.**

•

• Fearing an increase in absenteeism, Bell Aircraft Corp. has abandoned previously announced plans for instituting a 10-hr. work day at the request of WPB.

•

• Our Toronto editor reports the United States Government has formally accepted the Ancor process as an advanced method of producing alumina from clays and the WPB has authorized a plant to be erected in South Carolina. The process was developed by Canadian scientists working for Ventures, Ltd., Toronto.

•

***• Direct war expenditure by the Canadian government totalled $1,971,475,919 for the first seven months of the fiscal year which commenced April 1. Total expenditures to Oct. 31, were $2,619,686,481, an increase of $243,955,773 over the corresponding period of 1942.***

•

• C. H. Millard, Canadian director of the U.S.W.A., has called on Prime Minister King to make a public declaration that full production is to be maintained in Canada's steel industry. In a telegram to the Prime Minister, Mr. Millard said he had returned from a country-wide tour of consultations with union officials, and curtailment in production is "reported in virtually every center."

•

• Steep Rock Iron Mines, Ltd., will go into production on schedule and 500,000 tons of iron ore will be mined in 1944, D. M. Hogarth, president, announced. Two new directors have been elected to the board, Dan B. McDougall of Montreal and John Stewart of New York and Buffalo.

•

**• Partners in the Spalek Engineering Co., Detroit, were sentenced to long prison terms and heavy fines recently for defrauding the government on war contracts. Federal Judge Frank A. Picard sentenced Adolph Spalek to 12 years in prison and $30,000 fine, and William J. Zrenchik to 7 years and $20,000. An appeal was filed by defense attorneys. The government charged that the partners had tried to defraud the government of $190,000 through payroll padding on war contracts. The company was a subcontractor to Ford, Chrysler and General Motors.**

•

**• The Peruvian Government has entered into a contract with C. C. Morfit & Associates of New York to complete full study and report on the coal and iron industries in Peru.**

•

• For the first time since the war the Russell Mfg. Co., Middletown, Conn., has resumed limited production of zipper tape for civilians. But the zipper itself will be steel rather than brass.

•

• Cash prizes have been awarded by Metallizing Engineering Co., Inc., Long Island City, N. Y., in the first of its new series of conservation contests. First prize of $200 was awarded to R. C. Overstreet, Tinnerman Products, Inc., Cleveland, for his description of a faster, more durable way to protect Speed Nuts against corrosion. Second prize, $100 in cash, went to L. W. Sagle, Baltimore & Ohio Railroad Co.

o o o

# . . . Cited for Awards . . .

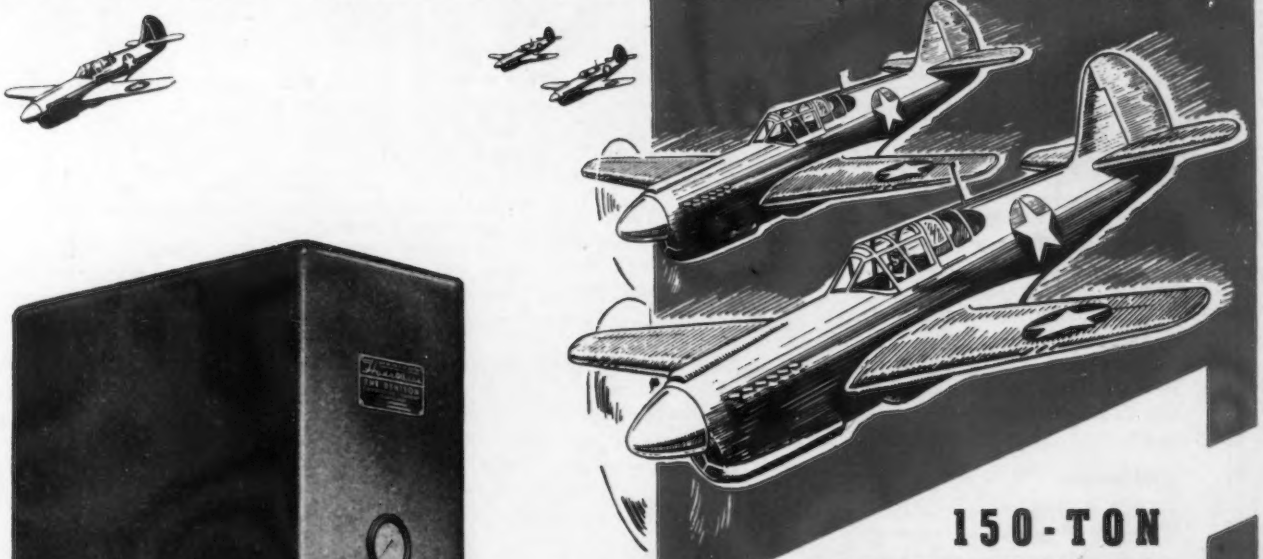
• • • The following companies have been recently awarded the Army-Navy "E" for excellence in war production:

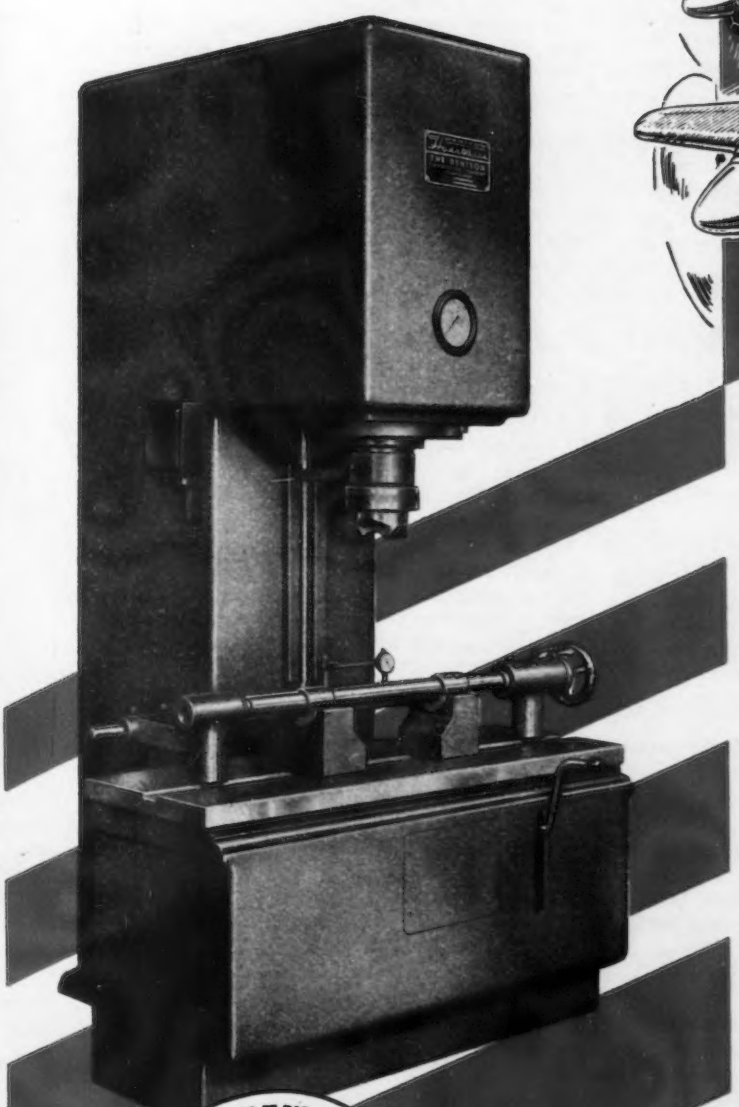
**Yale & Towne Mfg. Co.**, Philadelphia Div.
**Independent Pneumatic Tool Co.**, Aurora, Ill. (second star)
**Ladish Drop Forge Co.**, Cudahy, Wis. (second star)
**Four Wheel Drive Auto Co.**, Clintonville Plant, Clintonville, Wis.
**Gray Stamping & Mfg. Co.**, Plano, Ill.
**Frank G. Hough Co.**, Libertyville, Ill.
**Koehring Co.**, Milwaukee, Wis.
**Tennessee Eastman Corp.**, Kingsport, Tenn.
**Wilson Athletic Goods Mfg. Co., Inc.**, Chicago Plant
**Simmons Machine Tool Corp.**, Albany, N. Y. (second star).

### *Maritime "M" Award*

**Foran Foundry & Mfg. Co.**, Flemington, N. J.
**Columbia Steel Casting Co.**, Portland, Ore.

# FIGHTER AGILITY for PRESSING





## 150-TON STRAIGHTENING PRESS FEATURING QUICK ADAPTABILITY

**Fit as the latest fighter plane for quick action on pressing needs, this DLSC2 HydrOILic Press disposes of many straightening, assembling, bending and similar operations with oil-smooth ease and accuracy. Hydraulic operation gives it high flexibility of adjustment . . . permits the operator to regulate ram movement and pressure accurately by means of the control lever alone—while the press ram is in motion. No pre-set adjustments are necessary, yet pressure limits can be set at any point from 15 tons to full capacity, and stroke limit is fully adjustable up to 12 inches. Daylight opening is 42 inches, and the maximum throat opening is 20 inches.**

**Safe, easy access to the work area is assured by the DLSC2's compact, fully enclosed, round-cornered design, extra toe-space, and other safety features. Available with either foot pedal or hand-lever control. Other DLSC2 HydrOILic Presses have capacities of 25, 50 and 100 tons. For complete information, write to the Denison Engineering Company, 1158 Dublin Road, Columbus 16, Ohio.**

DENISON
EQUIPMENT *in* APPLIED
Hydr OIL ics
TRADE-MARK

# Fatigue Cracks

BY A. H. DIX

### Mars in Paid-For Space

• • • I haven't seen a single reference to the war in the advertising carried by the German metal publications, "Stahl und Eisen," "Metal und Erz," and others. But in your case Mars gets a play on nearly every page. Why is that?

—*Harold F. Cotter*

We don't know. If we had to guess we would say it is because under an expansionist policy like Germany's the state of war is exalted and periods of peace are regarded as strange interludes. War, being regarded as the normal condition, is taken for granted.

With us the opposite is true, but even here, as we become accustomed to war, the Mars theme appears less and less in industrial advertising. In only 14 of the 210 advertisements in last week's issue is the war mentioned other than incidentally.

### Aptronym

• • • O. C. Keener, of Delaware Ave., Kenmore, N. Y., is—of all things—an optometrist!

—*Al W. Smith, Chief Engineer, Rice & Adams Corp., Buffalo 17*

### Sound Your "A"

• • • In the list of enemy-owned patents running serially in The Iron Age, I noticed this on page 160, Nov. 18 issue.

(100) 1,927,154. Method and a machine for grinding of tuning-tongues. A. Dix, Germany. 9-19-33.

(1) Is this you? (2) And what is a tuning-tongue?

—*C.S.B.*

(1) No. We are the one who invented a sheet music turner-over. We were twelve at the time, studying violin under Herr Schneider, who was the string section of the Baum's Park full union bell orchestra. We never patented our brain child and will gladly exchange full rights for a bottle of Kreml.

(2) A tuning tongue goes into a tuning fork, on which you blow and get "A."

### Patent Rights for Practically Nothing

• • • Which reminds us to compliment the brains department for doing something constructive about postwar problems instead of merely talking about them. We allude to the lists of enemy-owned patents being published serially in your favorite family journal. These have been seized by our government and you can now use them without paying a royalty.

If the possibilities of the market for a machine to grind tuning tongues fail to excite you, there are thousands of others to choose from. These lists should be smack in the front of your "Postwar Plans" folder. The demand for them has forced us to reprint all the installments published so far. Send 24c. in stamps to us at 100 E. 42nd St., New York 17, and a copy is yours.

Huzza to the brains department for an approach to the postwar employment situation that is realistic.

### All God's Chillun Become Realists

• • • We are glad of the opportunity to use "realistic," as it is the *mot* of the moment. In Washington, the word style center, our clockers report that it has reached the high incidence rate of 3.7, meaning that many mentions per 100 words. The globe-trotting senators used it six times in their report—*"Churchill is a realistic man"*—*". . . we have adopted a realistic policy"*—and so on.

In an argument it is as handy as a bottle opener at a clambake. When your opponent brings up a point you can't answer, you merely look patient and say, "Let's be realistic," which gives the impression that he has both feet firmly anchored in cirrus cumulus.

### Stopper

• • • Saved by the Thousandth Part of a Duck—*Russell, Burdsall & Ward Bolt and Nut Co.*

### Umps, Sorry!

• • • You said recently, "We are not sorry that Mr. Faulkner has magnafluxed this surface crack in the brains department's omniscience."

A capital "M" in Magnaflux, please . . . We ask that you give us a break so that the word Magnaflux doesn't become as generic as Frigidaire and Kodak.

—*W. E. Thomas, Manager, Field Engineering, Magnaflux Corp., Chicago 31*

Our style sheet reads, "Always capitalize Magnaflux and Monel," and we apologize for the lower case. The point is an important one. Not long ago the owner of the trade name Cellophane sued because makers of similar products were using it. As we recall it, the court held that the owner should have squawked when the trade began treating the name as a common noun.

*("Is your Frigidaire a General Electric?" "No, it's a Westinghouse.")*

### Captious Columbian

• • • Our cry for copies of the Mar. 21 and Apr. 4, 1940, issues, which was generously answered by loving friends, brings this epistolary whiff of ammonia from Tullie Taylor, of the Buckeye Steel Castings Co., Columbus, O.:

Why bother about two frost-bitten issues of the family journal? We have them bound since 1911 when the journal was practically in its swaddling clothes, except lately since binding them has been classed as non-essential work.

Columbus, which we had hitherto regarded as a fair city, is the only place we have heard of where binding your favorite family journal, or any other, has been classed as non-essential work. In every other city a permanent guard for this pillar of wisdom is regarded as distinctly in the public interest.

If Mr. Taylor wishes to continue keeping his files intact for posterity all he need do is to ship his copies to our binder, Spink & Gaborc, at 26 E. 13th St., New York City. We like that name. Spink & Gaborc's charges are modest, $3.50 a volume (half year's copies) for buckram, and $5.25 for half morocco, but Mr. Taylor will have to pay carrying charges on copies to Spink & Gaborc, and on bound volumes away from Spink & Gaborc—Gaborc—Gaborc.

Furthermore, this journal was not in its swaddling clothes in 1911, being 56 at the time, and wearing detachable cuffs, LaSalle collar, pegtop pants, and bulldog toe shoes.

### Purr-Producer

• • • Contrast the foregoing with this from Paul Davis of Chambers Corp., Shelbyville, Ind.:

Upon perusal of our favorite department in the Oct. 28 number of our favorite family journal we note that some fellow who appreciates the better things allowed that appreciation to outweigh his scruples.

We are happy to be able to supply the two copies needed to complete the purloined volume.

We are purring.

### Puzzles

• • • Last week's military men line up thus: brigadier, Grenade; colonel, Verylight; major, Tank; captain, Mustardgas; lieutenant, Howitzer.

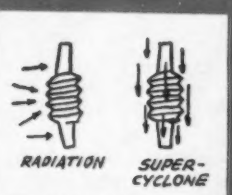
If you can solve this one in less than 16 stages, counting the initial stage as Stage No. 1, you are smarter than our puzzle book:

*A vintner has a 13-qt. jar full of wine, and a 7-qt. jar also full. His only other jar is an empty one of 19-qt. capacity. How can he measure out 10 qts.?*

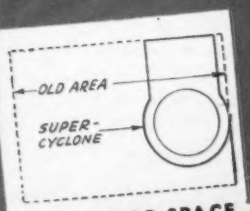
You get these advantages with the

# LINDBERG SUPER-CYCLONE

INCREASED PRODUCTION

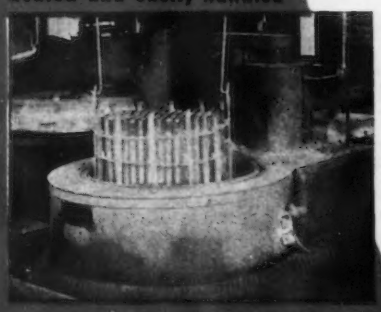



STRAIGHTER WORK




LESS FLOOR SPACE

Large loads are accurately heated and easily handled



The revolutionary idea of heating steel to 1750°F. with recirculated air is embodied in the Lindberg Super-Cyclone Furnace. This principle with its accuracy, rapid uniformity and close control of heating offers many advantages, a few of which are listed below.

## INCREASED PRODUCTION

The Super-Cyclone Furnace has increased production in the hardening of shells, rifle barrels, flanges, slip yokes, worm gears, bearing races, tank parts and hundreds of similar items. In some cases, production has increased *twelve times* over older methods of heat treating. Bulletin 130 shows how you can figure possible production increases on your own work.

## STRAIGHTER WORK

The Super-Cyclone's 100% forced convection heating principle heats the work rapidly and uniformly and eliminates the possibility of one-sided or radiant heat from striking the charge and causing distortion. Straightening time is eliminated or reduced to a minimum. Valuable man hours are released from the press for other work.

## LESS FLOOR SPACE

Based on averages of what the Super-Cyclone has done in other plants, you can figure that it will not occupy more than 1/3rd the floor area demanded by conventional equipment to handle the same or greatly increased production.

## EXTRA MAN HOURS AVAILABLE

The Super-Cyclone method of handling work on fixtures or in baskets, eliminates the individual handling of parts in heating and quenching. In many plants, lone operators handle large loads through successive steps of heat treatment, for example, forgings are normalized, hardened and tempered in the same Super-Cyclone without being removed from the fixture.

## SPECIAL HEATING

Because the Super-Cyclone can be heated at any desired rate to 1750°F. and cooled according to a definite schedule, it is well suited to stress relieving, cycle annealing, malleablizing, and other heating operations requiring a specific cycle. Write for the Super-Cyclone Bulletin 130.

**LINDBERG ENGINEERING COMPANY**
**2452 West Hubbard Street • Chicago 12**

ARMY E NAVY

# LINDBERG FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

# Dear Editor:

## TOOL STEEL DIRECTORY

Sir:

We had occasion to look at your Directory of Tool Steels. This has already helped us to identify some Graph-Mo tool steel listed as excess with this office.

How can we obtain a copy of this publication, as it will be of value to us in our work of redistribution of excess materials?

*HOWARD C. LOEHR*
*War Production Board,*
*602 Petroleum Bldg.,*
*Tulsa 3, Okla.*

● The first edition is out of stock, but a completely revised edition is now on the press. The print shop tells us we shall have copies within a week. The Directory is pocket-size, 5¼-in. by 7¼-in., 80 pages, price $1.—Ed.

## CYCLOGRAPH

Sir:

Your Nov. 4 *News Front* mentions Cyclograph, an electronic device for testing internal stresses of armor piercing shot, and other metal products. Who makes this instrument?

*J. P. COONAHAN,*
*Purchasing Agent*
*Midvale Co.,*
*Nicetown,*
*Philadelphia 40*

● Allen B. Du Mont Laboratories, Inc., Passaic, N. J. See pages 57-58 of the Nov. 4 issue for a description.—Ed.

## CERROBEND

Sir:

Who makes Cerrobend, the alloy with a melting point of 160 deg., which is used in bending tubing?

*NILSSON TOOL & DIE WORKS*
*322 Lewis Street,*
*Oakland 7, Cal.*

● Cerro de Pasco Copper Co., 40 Wall St., New York.—Ed.

## COOLED DRILL POINTS

Sir:

Did you publish an article on the method of keeping a drill point cool during drilling?

*RUDOLPH GOLDSCHMID*
*Major Die & Tool Co.,*
*3628 West Pierce Street,*
*Milwaukee 4*

● See pages 48-51 of the June 17, 1943 issue for description of a drill press attachment that causes the drill to reciprocate.—Ed.

## SEAPORCEL

Sir:

A recent *News Front* mentions Seaporcel, a fireproof ceramic (glazed) coating used on ship plates and elsewhere. Who makes it?

*T. E. PIPER,*
*Process Engineer*
*Northrop Aircraft, Inc.,*
*Hawthorne, Cal.*

● Suggest you communicate with J. A. Stewart, 209 Fourth Ave., Pittsburgh.—Ed.

## ARTERIES UNHARDENED

Sir:

It is now many years since I wrote to you first and during that interval we have been regular subscribers to THE IRON AGE, which to quote Shakespeare:—"Age cannot wither her, nor custom stale her infinite variety." By this is meant that your journal still maintains the vigor and fresh outlook of youth in spite of its age and in addition speaks with the weight of experienced authority as a leading technical journal. I congratulate all connected with it. I have learned many useful things from its pages, which I still read regularly.

*ALBERT WEDDELL*
*W. G. Allen & Sons (Tipton) Ltd.,*
*Princes End Works,*
*Tipton, Staffs, England*

## TREND IN STEEL OPERATIONS

Sir:

I have read with a great deal of interest Tom Campbell's article in the Nov. 18 issue on the trend in steel operations. I would like to have two copies of the chart appearing on page 92 of the issue.

*W. E. BLACKBURN,*
*Manager of Sales*
*Carnegie-Illinois Steel Corp.,*
*320 North Meridian Street,*
*Indianapolis*

## FLAME HARDENING

Sir:

We would appreciate a reprint of the series by A. L. Hartley on "Flame Hardening," which appeared in your issues of Oct. 17, 24 and 31, and Nov. 7 and 14, 1940.

*P. F. BANNISTER,*
*Adv. Mgr.*
*Fafnir Bearing Co.,*
*New Britain, Conn.*

Sir:

Kindly forward a reprint of the five-part series on "Flame Hardening."

*C. BINTZ,*
*Vice Pres.*
*Wickes Bros.,*
*Saginaw, Mich.*

● The demand exhausted our supply, but photostats can be furnished at 50c a page.—Ed.

## PLASTIC PISTON RING INSERTS

Sir:

In a recent issue you refer to the use of Bakelite plastic insert in piston rings. Will you kindly give us the name of the firm or individual to contact for further information on this application.

*DON MASSON,*
*Technical Editor*
*Bakelite Corp.,*
*300 Madison Avenue,*
*New York 17*

● Edward Stead, Chief Engineer, American Hammered Piston Ring Div., Koppers Co., Bush and Hamburg, Baltimore 3, Md.—Ed.

## SECRET STATISTICS

Sir:

The country is done a great disservice and business is being severely handicapped by the refusal of government to release the statistics so necessary to sound and efficient planning. In 1941 and 1942 the figures on production, consumption, and stocks on hand for many commodities—such as copper, aluminum, a number of synthetics, many items in the chemical field, as well as numerous others essential to industry — were quite properly held back because they could "give aid and comfort to the enemy."

With the day of "on hand and on order" past, and with our production at record levels and still rising, this need for secrecy is gone. What possible figure of ours, on any commodity, could fail to make similar figures of our enemy pale into insignificance?

Planning for the future, now, is imperative—and this does not, by any means, infer that it will be done at the expense of war needs. All of the reliable business statistics that were available prior to the war should be released promptly to aid in this planning. To plan intelligently requires trustworthy statistical information. Unreliable data means catch-as-catch-can planning, added costs, production loss and a shameful waste of manpower.

I submit that businessmen (the specialists in each line) with all the facts before them, can better determine the necessities of the day than any small group of office holders sitting in Washington. I am afraid the principal motivating influence behind the secrecy on statistics is to retain power and continuity of office—the withholding of facts certainly is an aid to this end.

To my knowledge some items are already more than sufficient to meet the war needs, and there are undoubtedly others, and yet as recently as July 17 J. A. Krug, Program Vice-Chairman, WPB, wrote to Mr. John F. Fennelly, Executive Director, Committee for Economic Development, Dept. of Commerce Bldg., Washington, D. C., that—

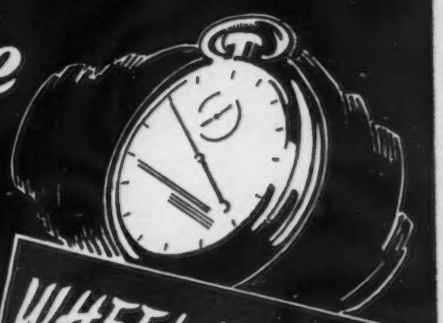
*"The materials situation is still so critical that the War Production Board finds it impossible to allocate even small quantities of material for the development of postwar products. As you know, it has been impossible to supply all of the materials considered essential for wartime purposes, and we see no chances for the material situation improving at any time soon."*

Question: Where is the evidence that this blanket denial is justified?

*WHIPPLE JACOBS,*
*President*
*Belden Mfg. Co.,*
*4647 West Van Buren Street,*
*Chicago*

● Donald M. Nelson says, "Our production position is now so strong that information concerning it will be of no aid or comfort to the enemy—quite the contrary . . . He promises that "within a few days" figures will be available on production or shipments, material consumption, inventories and researches, fabricating capacity and utilization, employment, impending bottlenecks.—Ed.

# How to Make a Big Cleanup in RECORD Time



## WHEELABRATOR Airless Blast Cleaning

### Some Big Clean-ups

- **A Wheelabrator Special Cabinet** at Spring City Foundry Co. cleans 4 to 6 tons of miscellaneous steel castings per hour. The castings vary in weight from 1 lb. to 1 ton each.
- **A Wheelabrator Tablast** (No. 2 Multi-Table type) is cleaning 8,000 lbs. of heat treated tractor bull gears per hour for a large farm equipment manufacturer. The gears weigh 70 to 80 lbs. apiece.
- **A Wheelabrator Tumblast** (48 x 42") cleans 22 tons of gray iron textile parts in less than 5 hours at the Draper Corp., Spartanaburg, S. C.
- **A Wheelabrator Tablast** having 60" dia. tables cleans 3 tons of green and annealed castings per hour for a prominent Toledo steel foundry.
- **A Wheelabrator Tablast** (6' Plain Table type) is cleaning manganese bronze gear blanks and other bronze castings producing as much work in 3½ hours as formerly required all day and part of the second shift using tumbling barrels at Pontiac Foundry and Machine Co.

WE wish you could step into some of the foundries that are using the airless Wheelabrator and see for yourself the tremendous loads that are being cleaned in a matter of only a few minutes.

In the mill type machines—the Wheelabrator Tumblasts—loads seldom run over 15 minutes. Most jobs are finished in from 5 to 10 minutes, including loading and unloading time. Seven Tumblast sizes are available ranging from the small 15" x 20" mill (1 cu. ft. capacity) to the largest mill, the 60" x 96" (63 cu. ft. capacity).

The table type machines—the Wheelabrator Tablasts—are likewise rapid production units. At top speed they will clean much faster than a workman can change the work on the table. Sizes are available for every requirement.

Of important significance to buyers of special production equipment are the many successful engineering achievements made by American in the field of Specially Designed Wheelabrator Cabinets, in which the invention and development of unique work-handling features have utilized the potentialities of airless blasting to the fullest possible extent. The exceptional performance of these machines on hundreds of special applications such as cylinder blocks, armor plate, brake drums, sanitary ware, tank turrets, etc., has been the keynote of their extensive use among top flight industrial plants.

Read more about the accomplishments of these machines in the adjoining column. Then, to satisfy yourself that they will do the same for you, ask to have a test-cleaning made on your own products.

**American**
**FOUNDRY EQUIPMENT CO.**
510 SOUTH BYRKIT STREET · MISHAWAKA, INDIANA

***World's Largest Builders of Airless Blast Equipment***

# This Industrial Week . . .

- ***Necessity of Start Toward Reconversion Emphasized***
- ***New Cutbacks Loom; Some Military Items Under Pressure***
- ***Drop in Steel Rate Below 80 May Knock Out CMP Plan***
- ***Ingot Operations at 99 Believed Near Their Peak***

NEW cutbacks in certain types of war equipment became known this week, while upon other military items pressure has increased for quick delivery, but the predominant thought in the metalworking industries over the nation is centering around the necessity for a start toward reconversion.

The persistence of this thought is understandable, particularly since some Washington authorities seem to be expecting quick changes. C. E. Wilson of General Motors stated the case succinctly when he pointed out that "business is not like turning on and off a faucet." Industrialists are urging that at least permission should be given where feasible for the making of tools, dies, fixtures and molds necessary for reconversion.

Considerable readjusting of aircraft production schedules has been under way recently, with some suppliers' contracts pushed back or eliminated. With supply lines heavily filled, orders for considerable military ground equipment have been cancelled or trimmed. Industrialists are expecting further cancellations in the small arms program and perhaps another sharp slash in the army tank program. It is predicted that the reductions in the arms program may result in the dismissal of at least 40,000 factory workers but at the same time it is said that the manpower situation still is climbing toward its peak of tightness.

Contrasting with the reductions in contracts, new secret weapons for the Army and Navy are creating a tight situation at certain tube mills, the demand for truck parts is far above supply, and renewed emphasis is noted upon construction of landing craft.

Meanwhile, the steel industry still is piling ingots and the national production rate, estimated this week at 99 per cent, up one-half point, plainly is being buoyed by heavy plate and sheet orders. Some authorities believe steel operations are near their peak now and soon may start to recede. At the year's end, in the opinion of one Washington expert, as many as 40 to 50 open hearths may be idle.

RELAXATION of government limitation orders, predicted last week, is quite likely. If the rate of steel operations hold between 80 and 90 per cent, the CMP plan probably will be continued very much as it exists now, but if the ingot rate drops below 80 per cent, the CMP plan may be dropped entirely or modified drastically.

There is a way in which steel production could be held fairly high for some time, and that is by rolling advance requirements of certain agencies such as the Maritime Commission. If this procedure were adopted, some agencies might have their full 1944 requirements much earlier than originally expected. Maritime, for example, might have its steel in full by the end of the second quarter.

Aside from recent cancellations resulting from cutbacks in the war program, the steel industry has noted an increase in cancellations from customers who apparently have been checking more closely their inventory position. Also, the difficulty in obtaining plates and sheets has forced cancellations of other types of steel from some manufacturers such as farm equipment makers.

At the same time, an increase in "conditional orders" for steel for use after the war ends is noted through the industry. Auto parts makers have been particularly aggressive in this respect. Machine tool builders also have been receiving orders for specific types of equipment to be built and delivered within a specific period after controls over materials are eased.

Huge quantities of steel are now listed as surplus inventory at WPB regional redistribution offices over the nation. In the San Francisco territory between 75,000 and 100,000 tons are reported in sight for listing. It is estimated that probably 75,000 tons of aircraft steel may be in the idle or surplus category over the nation.

THE easier steel situation has led to rumors that the giant DPC Geneva Works in Utah may not operate, or if it does, that it may only operate at a greatly reduced rate. Confirmation of these reports is lacking from both government and company sources. There seems to be some support for the belief that this mill will not operate at anywhere near the activity envisioned a few months ago. Plans

### *News Highlights in This Issue*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| WPB on Scrap | 104 | | |

covering the final construction and operation of the plant may be changed sharply.

WPB's role in effective reconversion of industry has been endangered by the inclination of many officials of the agency to leave Washington and return to their normal positions in industry. However, there is now hope that C. E. Wilson, executive vice chairman, may be prevailed upon to remain and to assist in the reconversion job, which will require personnel fully as well trained as was necessary in the switch from peace to war.

The weakness in alloy steel scrap is more pronounced. Supplies are plentiful and substantial tonnages are going begging. Amounts being sold often are minus the customary premium price for alloy content. However, rumors that scrap allocations may be abandoned are denied strongly at WPB despite the fact that many Steel Division officials expect lower steel operations. Cast iron grades continue to be tight, particularly west of the Mississippi.

The CIO steel workers' union this week is perfecting its plans to obtain a wage increase from the steel industry. The following procedure is expected: The union may demand 15c. or more per hour wage increase, the steel companies will probably advise that this is a matter for the War Labor Board, the latter may call for briefs from both sides and will finally rule on the union request. In view of the raise in coal mine wages, it is expected some sort of an actual increase in steel wages will be granted.

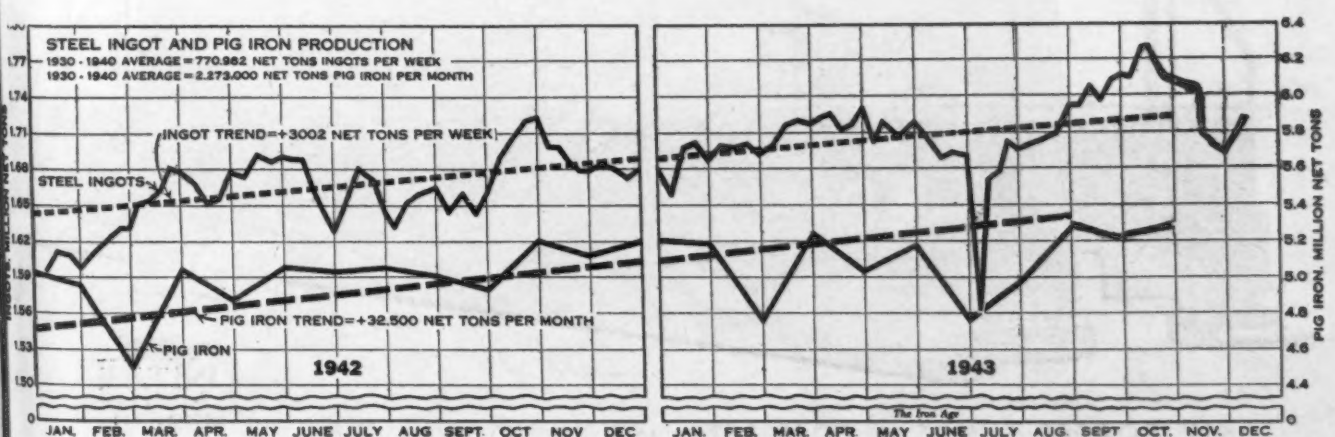
About 10,000 tons of steel ingots were lost last week at the Defense Plant Corp. open hearth department, Homestead Works, Carnegie-Illinois Steel Corp., when a two-day outlaw strike forced the shutting down of eleven open hearth furnaces. The stoppage was the result of a wage grievance, as well as the dismissal of an employee who was alleged to have been a ringleader in the trouble.

## *Sidelight of This Week's Summary*

**• • • Along with the disposition to cancel steel orders, purchasers are reported to be increasingly reluctant to accept NE 9400 steel, which may help bring about the dropping of this particular grade . . . Henry Kaiser's installation of an electric furnace, reported here previously, followed a study of possible West Coast alloy steel consumption by Kaiser which indicated heavier demand than anyone previously had predicted. The Kaiser 30-ton unit was picked up quickly through fortunate circumstances . . . While gray iron is piling up at several eastern production points, the supply of malleable is inadequate. In fact, new facilities for the handling of malleable are being rushed with high priorities. Inactive foundries are being asked to make cupola malleable, but so far few have warmed up to the suggestion . . . Competition for alloy steel business probably will be heightened by the short cycle methods adopted by some producers who make use of the cupola and bessemer, thereby lessening electric furnace heat time . . . Electric furnace producers will have difficulty retaining all the business transferred to them by Direction No. 2 as some contracts are said to stipulate that if the order is abandoned an immediate return to open hearth alloy shall be made.**

THE national steel operating rate gained half a point this week to 99 per cent of capacity. At Chicago output gained half a point to 103 per cent, highest since Oct. 26, 1942. Youngstown was up one point to 95.5 per cent while Detroit showed a gain of two and a half points to 98 per cent. Declines this week occurred in only two districts, Cleveland down three and a half to 88 per cent and Cincinnati down two to 103 per cent. Unchanged from last week are Pittsburgh at 102, Philadelphia at 93.5, Buffalo at 99.5, Wheeling at 95, Birmingham at 99, St. Louis at 112 and the Eastern district at 95.5 per cent.

The Iron Age


STEEL INGOT AND PIG IRON PRODUCTION
1930 - 1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930 - 1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
INGOT TREND = +3002 NET TONS PER WEEK
STEEL INGOTS
PIG IRON TREND = +32,500 NET TONS PER MONTH
PIG IRON
1942
1943
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEPT. OCT NOV DEC
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
PIG IRON, MILLION NET TONS

## *Steel Ingot Production by Districts and Per Cent of Capacity*

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| November 25... | 102.0 | 102.5 | 94.5 | 93.5 | 91.5* | 99.5 | 95.0 | 99.0 | 95.5* | 95.0 | 105.0 | 112.0 | 95.5 | 98.5 |
| December 2.... | 102.0 | 103.0 | 95.5 | 93.5 | 88.0 | 99.5 | 95.0 | 99.0 | 98.0 | 95.0 | 103.0 | 112.0 | 95.5 | 99.0 |

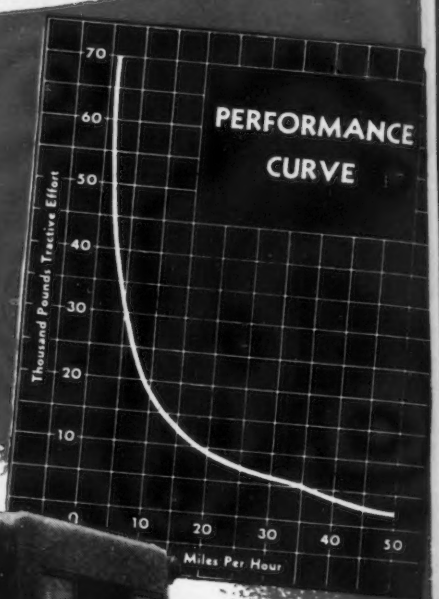
*Revised

# 100 TON PORTER

## 650 H.P. DIESEL ELECTRIC SWITCHER

### TWIN-POWERED FOR DOUBLE AVAILABILITY

Built for heavy yard, terminal and belt-line work, this newest 100-ton 650 horse power PORTER is in every sense a railroad man's switcher. Powered by two complete Diesel-Electric Units, it is equal to the toughest switching job, yet is versatile enough to be used for light work. Its two independent power plants insure constant availability and unlimited operating range. Complete specifications on request.



ONLY *PORTER* BUILDS A *COMPLETE* LINE OF LOCOMOTIVES

**H. K. PORTER COMPANY, INC.**

PITTSBURGH PENNSYLVANIA

# Byrd Committee Favors Reducing Gov't. Staffs; $1-Billion Economy Seen

NEWS ★ OF ★ INDUSTRY

*Washington*

• • • In recommending that 300,000 additional government employees be dropped from Federal payrolls, the Byrd Congressional Committee on the reduction of nonessential federal expenditures said that the release of this number of employees would result in an annual saving of $1,000,000,000. Considering that there are about 3,000,000 such employees, the recommendation errs on the side of conservatism.

The report says that the committee found that the government doesn't know how many typists, engineers or any other classification of workers it has. Nor does the government know where its employees are located.

Through the adoption of a new personnel reporting system the committee says $10,000,000 might be saved through improved manpower utilization.

Other recommendations of the committee were: Immediate elimination of all personnel of those agencies or parts of agencies which have been ordered to liquidate as soon as possible.

A reduction of at least 150,000 War Department clerks.

A drastic reduction in the number of employees in overlapping, duplicating, non-war agencies.

Overall reductions in personnel of from 100,000 to 200,000 employees resulting from more efficient personnel management.

The immediate institution of manpower utilization surveys by the Civil Service Commission in conjunction with the Bureau of the Budget with a view toward reducing and more fully utilizing personnel in all departments.

Moreover, the committee said that while the government has reduced its payrolls by 141,058 since June pursuant to the committee's recommendations, executive agencies have requested 130,000 new employees from the Civil Service Commission.

In June, when the committee issued its first personnel report there were 3,095,000 paid federal civilian employees, or approximately 90,000 more employees than in April, which was the latest month for which figures were then available. As of September, there were 2,963,405 civilian employees of which 1,538,817 were not engaged in direct mechanical war production.

The report said: "Therefore, the Committee finds that some progress has been made in reducing federal employment, but not to the extent to which the committee finds is possible. Had it not been for a reduction of 139,968 employees in the War Department between June and September there would have been a new increase in the entire federal service during that period of 8910 employees.

"Further, the fact that the departments and agencies have requested 180,000 additional employees be furnished by the Civil Service Commission, shows that not all departments and agencies are attempting to eliminate personnel."

The committe said that for every employee who has been transferred through the federal manpower utilization program there are at least two surplus employees who are either idle or not working more than 50 per cent of the day.

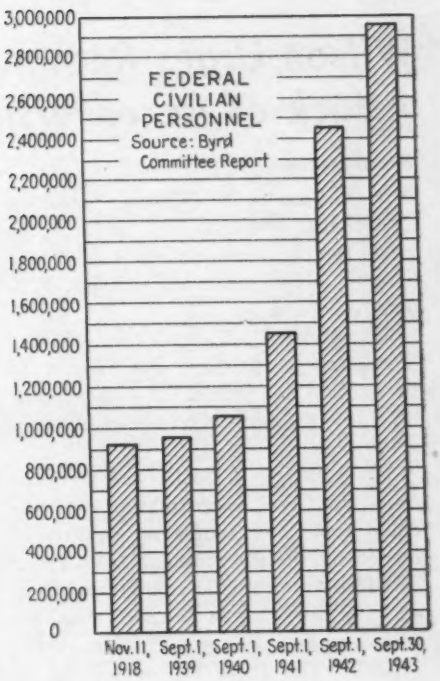
Though Congress has ordered the elimination of the WPA NYA, CCC and Bituminous Coal Consumers Counsel, National Resources Planning Board, Board of Legal Examiners, and the OWI Domestic Branch, only 17,344 employees have been eliminated. The committee claims, with the reductions effected in the Farm Security Administration, that 33,961 employees should have been dropped.

Striking at duplication in nonwar agencies the committee recommended that all of Agriculture's lending agencies should be unified. Said the report:

"There are seven agencies aside from the Department of Labor dealing with labor problems. If the functions of the ODT were placed under the Interstate Commerce Commission, an estimated saving of $2,000,000 and thousands of man-hours would be effected annually.

"The Federal Trade Commission and the OPA are in many respects so closely related as to benefit by a single identity.

"One of the principal functions of the Civil Service Commission is to investigate and to hire employees for the various federal establishments. This it does at a cost of $57.95 per employee hired. Yet every department and agency has its own personnel officers and administrators, investigators and experts, clerks and stenographers, who investigate, classify, and recruit employees—the very work the Civil Service Commission is supposed to be performing."




## General Motors' Idea May Have Sired Blow

*Bristol, Conn.*

**• • • Perhaps a General Motors' idea helped put across one of the major strokes against the Axis. The New Departure Division of the General Motors Corp. in a newspaper advertisement points out that on Aug. 16 New Departure told the nation that lack of anti-friction bearings could bring this highly mechanized war to a grinding halt. The same newspaper ad then hails with pride the Army Air Force raid Oct. 15 on the Nazi ball bearing center, Schweinfurt-on-main. G-M does not directly claim credit but alludes to the coincidence—or was it?**

# Wilson Urges Recognition and Attack of Reconversion Problems

***Washington***

• • • **Charles E. Wilson,** president of General Motors Corp. on Nov. 24 gave the Truman Senate Committee a formula for reconversion. Mr. Wilson's formula is:

Recognition of the time factor necessary to prepare for return to production for peace. Advance planning and solution of bottlenecks would solve this.

The securing of bottleneck machine tools and the unscrambling of machine tools and industrial equipment owned by the government from those owned by automobile companies. General Motors owns 85,838 machine tools while the government owns 56,700. The tools are mixed up in 105 plants.

The plans must be laid for expansion of the automobile business to the post-war demand. To do this automobile companies must have definite knowledge of what the government wants to do with inventories and machinery. General Motors owns $500,000,000 worth of inventory.

Modernization of plants with new surpluses in machine tools.

**While saying that** he thought it would take General Motors from three to six months to get into a fairly good rate of automobile production the country should recognize that complete conversion cannot be accomplished as soon as manpower and materials are made available.

Pointing out that steels are not the same chemical analyses as used in peacetime, Mr. Wilson said that the General Motors now uses .75,000 tons a month while in the 1940-41 period the corporation used 250,000 tons.

"I personally think the steel shortage is about over, or perhaps is over and we don't quite recognize it yet," Mr. Wilson said.

Mr. Wilson said that since the construction program and machine tool program were about at an end, that inventories have been built up and the commercial inventories existing before the war which ran into billions could not be used. Mr. Wilson said:

"In addition to the finished material that went into the finished products that came out of the plants, a tremendous amount of material was going into the preparation of facilities and building up of inventories, not only to a peacetime level, but with increased activity inventories had to be higher. That is about over because this thing is getting stabilized and perhaps from now on about as much ought to come out at the finished end as goes in at the bottom."

Denying that post-war planning will cause any breakdown it the war effort of workers when they know about it, Mr. Wilson said:

"As far as the peace is concerned, while the people were not all reconciled to the fact, or even a majority of them, that we were going to have a war, they all are looking forward and recognize that some day the war is going to be over and we are going to have peace.

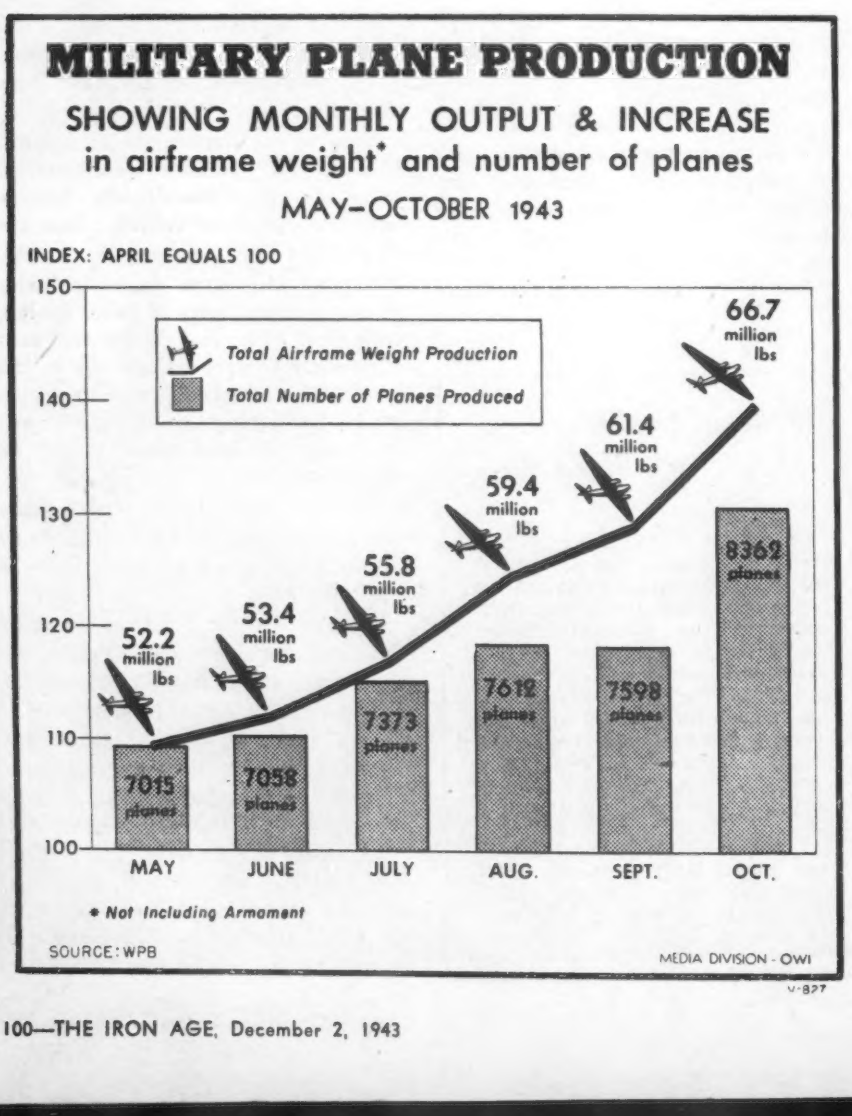
"I personally think we should trust the people of our county and not be afraid realistically to do something about the post-war problem."

**Pointing out** that the machine tool industry is now slowing down from its wartime peak, and that since steel will be available, bottleneck machinery which automobile plants have loaned or sold during the war should be made by machine tool companies. He said that General Motors has had on order 61,000 machine tools. All have been delivered except 3000 and 1500 are slated for delivery this month. Mr. Wilson gave this as an illustration of the decline in war business for machine tool makers.

General Motors has accepted $10,000,000,000 worth of war contracts. The value of its production for the three years ended Dec., 1943, is: 1941, $406,000,000; 1942, $1,898,000,000 and 1943, $3,620,000,000.

Mr. Wilson said that the government owns 14 plants which cover 12,000,000 sq. ft. of floor space. This is in addition to the 105 plants owned by the corporation.

He said that in its settlement with the government, that General Motors would have to look out for about $1,250,000,000.



# New Weapons for Army and Navy Heighten Pressure Upon Draw Benches

• • • **Examination** of minutes of a Nov. 9 meeting of the WPB Tubing Industry Advisory Committee shows that large new military requirements are posing problems for producers.

For a new Army weapon, the use of hot-rolled 8630 steel has been approved in substantial monthly quantities. The size is over 4-in. o.d., medium wall, alloy steel. Specifications originally called for cold drawn material, which would have required the creation of many new draw benches. A new Navy weapon will require the use of large amounts of 3¼-in. x 11-gage cold drawn alloy and will necessitate several new draw benches.

Some tonnage may be moved from seamless mills to welded mills so that the seamless may help produce tubing for the special weapons, it was said.

Using the second quarter of 1944 as a typical period, Lieut. C. E. Jones of the ASU cited the following figures (for aircraft alloy steel tubing, including stainless) before the meeting:

| Size | Total Requirements in Pounds (Approximately) | Stainless |
|---|---|---|
| Up to 1 in. | 8,740,000 | 1,085,000 |
| 1 in. to 2 in. | 11,000,000 | 348,000 |
| 2 in. to 4 in. | 14,000,000 | 2,000,000 |
| Over 4 in. | 30,000,000 | ..... |

About 10,600 tons of alloy per month, approximately the amount that has been furnished heretofore, will be required in 1944, it was said. Two or three thousand tons of carbon a month will also be needed.

It was said a serious situation may develop in production of lighter sizes up to 1½ in., 14-20 gage, from an order standpoint. Changes in plane design have required changes in new tubing measurements. Aircraft companies must maintain tubing inventories for completion of planes on old designs. A recent cancelation of an aircraft company contract in the South revealed an inventory of 300,000 feet of tubing in approximately 100 sizes; that inventory was a normal requirement during the lifetime of the contract. Inventories available through cancelation will reduce Dayton allocations to tube mills for production of lighter sizes. A new requirement that is expected to develop will probably permit maintenance of light-wall production, W. H. Wiewel remarked.

The decrease in requirements for aircraft tubing of lighter gages is not expected to be substantial, Lieut. Jones said. Transitions from one size to another, however, cannot be predicted because they depend on what plane designs will be discontinued. The trend is toward heavier-walled tubing for production of bombers and fighters. Production of trainers, which require a greater footage of light-size tubing, is expected to decrease.

About 85 per cent of the items that have been produced from hot-rolled steel have been switched to cold-drawn in accordance with a previous promise to permit this switch as soon as capacity opened, Lieut. Jones told the committee. If cold-drawn should become overloaded, a reswitch will have to be made to hot-rolled; hot-rolled may be used, but aircraft companies prefer cold-drawn tubing. Cold-drawn capacity is overloaded, and hot-rolled capacity is looking for orders, a committee member said. Only two mills are producing both hot- and cold-finished tubing, Lieut. Jones said.

Although the tubular industry technical committee had voted to retain the prohibition against manufacturing high-sulphur tubing after the advisory committee had stated that the provision had not achieved the anticipated results, the prohibition has become meaningless because practically every appeal from its effect has been granted, Mr. Wiewel told the committee. Only one mill has been willing to make high-sulphur tubing. The principal user is the aircraft industry, and aircraft manufacturers have been able to prove that they would have to retool to use low-sulphur tubing. The committee acquiesced in Mr. Wiewel's suggestion that a further attempt be made to delete the paragraph in schedule 6 referring to high-sulphur tubing.

Allocation of welded shipments has been discontinued because warehouses have reported that electric welded tubing has not been moving, Lieut. Jones reported. Requests for welded have been decreasing, he stated. The trend away from electric welded should be checked because draw benches are fully loaded, stated W. H. Wiewel of WPB.

*. . . Gee, Mr. Mack, it went "W-O-O-O-O-O-O," so I got scared and pulled it out and then it went "Bing"—What do I do now?*

*Courtesy Syracuse Heat Treating Co.*

# Steel Union Maps Final Plans Toward Gaining Boost in Wage Rates

***Pittsburgh***

• • • **The United** Steel Workers of America Union, representing more than 600,000 steel workmen, is expected this week to make final plans looking toward a demand for at least 15c. an hour increase in the hourly wage rate.

Such a demand if granted by the War Labor Board would relegate to the ash heap the "Little Steel" formula. The fact that coal miners were granted an actual raise in pay regardless of the method is expected to give the steel workers "a day in court."

The meeting of the executives of the union, followed by a full meeting of the district officials, is expected to be only a prelude to a full demand for higher steel wages requiring reopening of 1300 wage contracts.

The WLB in the last analysis will be the one to decide when and if steel workers are to get more pay per hour. The procedure is expected to be as follows: The union may demand from 15 to 20c. per hour increase from the steel companies; the companies will probably advise that this is a matter for the WLB; the latter will probably require briefs from both sides and will finally rule on the union request. In view of the coal mine increase it is expected that some sort of an actual increase in steel wages will be granted.

Steel company briefs are expected to point out that steel prices generally have been stablized at 1938 levels.

# Ore Fleet Within Reach of Goal

***Conneaut, Ohio***

• • • **Early this week,** the iron ore industry was within two per cent of reaching the 1943 ore requirements which were to be brought down the lakes. The WPB had set a goal for a vessel movement of about 85 million tons. The weather has favored ore shipments recently, and it is expected that some boats leaving here this week from the Pittsburgh & Conneaut Dock Co., U. S. Steel Corp. subsidiary, will be able to make one more return trip. These conditions about match last year's experience, when the season lasted until about Dec. 10 to 12.

Pittsburgh Steamship Co. vessels this season will have brought more than 12 million tons of ore to the Conneaut dock here, which represents about 14 1/3 per cent of all the ore handled on the lakes. Last year, the Conneaut dock handled about 12½ per cent of the 1942 tonnage, or about 12½ million gross tons. The increase in the participation is due to greater requirements of at least one of the corporation plants at Pittsburgh. The decrease in total shipments this season was due to a late start of shipping earlier this year, due to weather conditions.

Ore and railroad officials here are optimistic concerning ore supplies until the lake season opens next year. It is believed that there will be ample ore to take care of steel demand, until shipments begin again. The ore situation may also be bettered by the fact that steel output, during the first three months of 1944, may not match the production during the last quarter of this year. At any rate, there is no fear that an acute shortage of ore will develop in the industry this winter.

**METAL CUTTING ENGINEERS.** The Subcommittee on Metal Cutting Data and Bibliography of the American Society of Mechanical Engineers recently met in Cincinnati. Here shown on the steps of the new engineering service building of the Cincinnati Milling Machine Co. are, from left to right: Prof. O. W. Boston, head, department of metal processing, University of Michigan; M. E. Lang, engineer, Warner & Swasey Co.; W. C. DeGraff, manager of sales engineering, W & S; Fred W. Lucht, engineer, Carboloy Co., Inc.; Frank J. Oliver, technical editor, THE IRON AGE; W. L. Kennicott, engineer, Kennametal Inc., and M. Martellotti, research engineer, Cincinnati Milling Machine Co. The committee sponsored a number of papers on metal cutting presented before the annual meeting of the ASME, Nov. 29-Dec. 3, at the Hotel Pennsylvania, New York.

## By-Product Coke Price Rise Announced

***Washington***

• • • **An increase of 80c. per net ton** for by-product foundry and blast furnace coke, effective Nov. 1, granted operators in the central West and South, announced in THE IRON AGE, Nov. 18, page 95, was made public by OPA on Nov. 29. The increased prices affect Alabama, Illinois, Indiana, Kentucky, Michigan, Iowa, Minnesota, Missouri, Tennessee, Wisconsin and Ohio west of Cleveland.

The new basing point prices per net ton f.o.b. ovens are:

**Foundry Coke (by-product)**

Alabama, $9.30; Chicago, $12.30; Ashland, Ky., $10.80; Detroit, $12.55; Ironton, Ohio, $10.80; Portsmouth, Ohio, $10.80; Chattanooga, Tenn., $9.80; Milwaukee, $13.05.

**Blast Furnace Coke (by-product)**

Birmingham, $6.80; Holt, Ala., $7.10; Chicago, $8.95; Indianapolis, $8.30; Ashland, Ky., $6.80; Detroit, $8.15; St. Paul, $10.55; St. Louis, $8.93; Ironton, Ohio, $7.80, and Milwaukee, $8.85.

## L-211 Clarified by WPB

*Washington*

• • • **WPB has issued** an Amendment of Schedule 13 of Limitation Order L-211 to make clear that all kinds of piping and tubing used for structural or mechanical purposes are not covered by the schedule.

# Steel Producers Fight Rail Coal Rates

By TOM LLOYD
*Cleveland District Editor*

*Youngstown*

• • • **Railroad rates** on ex-river coal into Youngstown have long been regarded by steel producers and other commercial coal consumers in eastern Ohio to be excessive. Before the Interstate Commerce Commission, the Youngstown Sheet & Tube Co. offered evidences of this fact in an endeavor to bring about a more equitable readjustment of these rates. Normally considered a high cost producing area, it is feared that steel production will be gradually driven out of the Mahoning valley. Attempts to prevent this are naturally to the direct interest of business and public alike in eastern Ohio.

In the testimony presented by W. E. Fowler, general traffic manager of the Youngstown Sheet & Tube Co., attempt is made to show how steel producers and other commercial coal consumers are being discriminated against by the railroads, and records of both the Youngstown Sheet & Tube Co. and the Republic Steel Corp. were presented to substantiate the charges made concerning ex-river coal moved by rail from the Ohio River barge unloading points at Conway and Colona, Pa., into Youngstown and Warren, Ohio.

It is possible to move coal barged from the mines to Conway and Colona by rail to Youngstown mainly because of the efforts of a railroad that now carries none of it. The Pittsburgh, Lisbon & Western railroad in 1927 applied to the Interstate Commerce Commission for permission to build branch lines from the Ohio River to Youngstown, thus constituting a through line that connected with the Youngstown Sheet & Tube Co. plant tracks and with the Youngstown terminal tracks of the Erie Railroad. A rate of 60c. per ton was proposed for moving this coal by the Pittsburgh, Lisbon & Western Railroad. Because the Pennsylvania and Pittsburgh & Lake Erie Railroads, which had through lines, expressed willingness to construct river terminals and to name an ex-river rate on coal, the ICC denied the Pittsburgh, Lisbon & Western application. The Pennsylvania and Pittsburgh & Lake Erie Railroads built river terminal facilities and proposed a rate of $1.02 per ton, but the ICC sustained this offer, prescribing a rate not in excess of 77c. per ton, effective July 16, 1932. This 77c. rate was subject to a 6c. per ton emergency charge until Oct. 1, 1933.

**Briefly, this** history was as follows: On Oct. 1, 1933, the emergency charge was dropped, but from Oct. 1, 1933, to June 19, 1934, a 12c. per ton lifting charge was in effect, over the rate of 77c. per ton. On June 19, 1934, in spite of the fact that an application for a 90c. per ton rate (with a 12c. per ton lifting charge) was enjoined by court action, the minimum rate of 90c. was put into effect. On April 18, 1935, the rate was increased to $1.00 per ton by the addition of a 10c. emergency charge. In November,

(CONTINUED ON PAGE 134)

## TABLE I

**Pittsburgh & Lake Erie Railroad Freight Operating Expenses Reduced to Cost per Ton-Mile on (I) All-Revenue-Freight; and (II) Cost per Ton-Mile on Handling Youngstown Sheet & Tube Co. Ex-River Coal Based on an Average of All-Revenue-Freight Handling Costs**

| | | 1938 | 1940 | 1942 |
|---|---|---|---|---|
| | I—Pittsburgh & Lake Erie Railroad All-Revenue-Freight Operating Costs | | | |
| 1 | Railway operating costs assigned and apportioned to Freight Services (Dollars) | 10,449,513 | 16,115,445 | 21,491,658 |
| 2 | Revenue Tons Carried (Tons) | 18,579,199 | 32,977,150 | 42,556,268 |
| 3 | Total Loaded Freight Car Miles in Trains | 26,145,000 | 39,239,000 | 51,031,000 |
| 4 | Average Tons per Carload (Tons) | 48.3 | 50.4 | 51.8 |
| 5 | Average Haul per Revenue Ton (Miles) | 64 | 57.5 | 60.07 |
| 6 | Expense per Ton (Dollars) Line 1 ÷ Line 2 | 0.5624 | 0.4887 | 0.5050 |
| 7 | Expense per Loaded Car-Mile (Dollars) Line 1 ÷ Line 3 | 0.3997 | 0.4107 | 0.4211 |
| 8 | Average Gross Revenue per Loaded Car-Mile All Carload Traffic (Dollars) | 0.558 | 0.652 | 0.700 |
| | II—Youngstown Sheet & Tube Co. Ex-River Coal | | | |
| 9 | Average Tons per Carload (Tons) | 72.4 | 75.1 | 70.9 |
| 10 | Mileage from Colona, Pa., to Youngstown, Ohio | 41.5 | 41.5 | 41.5 |
| 11 | Expense per Ton (Dollars) Line 6 x Line 10 ÷ Line 5 | 0.3647 | 0.3527 | 0.3488 |
| 12 | Expense per Loaded Car-Mile (Dollars) Line 9 x Line 11 ÷ Line 10 | 0.6362 | 0.6383 | 0.5959 |
| 13 | Gross Revenue per Loaded Car-Mile (Dollars) | 1.570 | 1.629 | 1.537 |

## TABLE II

**Comparisons between Youngstown Sheet & Tube Co. Ex-River Coal and Other Commodity Hauls on the Pittsburgh & Lake Erie Railroad During 1941**

| COMMODITY | Total Carloads | Total Tonnage | Total Revenue, Dollars | Average Revenue Per Carload, Dollars | Average Tons Per Carload | Average Revenue Per Ton, Dollars | Average Revenue Per Ton-Mile, Mills | Average Revenue Per Car-Mile, Dollars |
|---|---|---|---|---|---|---|---|---|
| Ex-River Coal for Youngstown Sheet & Tube Co. from Colona, Pa. | 11,402 | 796,113 | 716,502 | 62.84 | 69.8 | 0.90 | 21.69 | 1.514 |
| Agricultural Products | 5,616 | 162,540 | 105,133 | 18.72 | 28.9 | 0.647 | 11.29 | 0.327 |
| Forestry Products | 8,426 | 179,923 | 176,995 | 21.01 | 21.4 | 0.984 | 17.17 | 0.367 |
| Manufactures and Miscellaneous | 320,441 | 11,871,329 | 12,908,124 | 40.28 | 37.0 | 1.087 | 18.97 | 0.703 |
| Petroleum Products | 10,311 | 296,749 | 301,225 | 29.21 | 28.8 | 1.015 | 17.71 | 0.510 |
| Iron and Steel Products, (Rated 6th class in Official Classification, NOS) | 20,952 | 1,209,942 | 1,096,573 | 52.34 | 57.7 | 0.906 | 15.81 | 0.913 |

# No Halt in WPB Scrap Allocations Seen; M-311 Blamed for Cast Shortage

*Washington*

• • • **Rumors that allocation** of scrap may be abandoned were scotched at WPB on Monday, despite the fact that many WPB Steel Division officials report that the rate of operations is expected to drop to 80 per cent in the second quarter of 1944 even though the war with Germany continues.

While there is a growing easiness in the scrap situation, there remains a tightness with regard to the cast iron grades, and shortages of carbon scrap in the far West, and the St. Louis and Kansas City areas. The generally easier situation is attributed chiefly to the cutback in the war program and the consequent closing down of open hearth furnaces. Because of the lack of supply of cast iron scrap for some consumers it was stated that WPB must allocate this material more widely than it has in the past. The shortage of cast iron grades is due in part, according to dealers, to WPB's Order M-311 which curtailed automobile wrecking and thus cut off an important source of supply, such as motor blocks. This order was designed to relieve the serious need for automotive replacement parts, a condition that still exists.

**Cast iron grades** were plentiful when the order was issued and while there never has been any formal relaxation, the order has been liberally interpreted as a means of getting greater supplies of cast iron grades. The shortages of this kind of old material also is claimed to be due in part to the OPA pricing policy which fixes prices on a shipping point basis. The result, it is said, has been that big dealers in northern consuming centers have been cut off from supplies of heavy breakable cast that formerly came from the South. It is contended that these dealers cannot purchase the unprepared material in the South, prepare it at $2.50 a ton and sell it at the OPA price levels at a profit.

Aside from the cutbacks and closing of open hearth furnaces the shortages of carbon scrap in several sections, it is said to be due to a breakdown in collecting and preparation arising from lack of manpower. Collectors and workers in scrap yards, it was stated, have been attracted by higher wages paid at defense plants. At the same time cutbacks in the war program have made consumers more cautious in making commitments. There now are sections where the surplus of scrap is being taken out of plus areas and allocated to minus areas.

o o o

# Castings, Chain, Rope Schedules Lag

*New York*

• • • **Despite the easing** of supplies of many previously critical materials and components, information placed before the Steel Mill Maintenance and Repair Industry Advisory Committee by members of its task committees placed steel castings, wire rope and chain high on the still critical list.

Manpower is charged with the steadily lengthening delivery dates on steel castings. The report indicated that a typical plant capable of producing 2100 tons a month is reduced to an output of between 1300 and 1500 tons mainly through shortage of men. Production schedules of most foundries are reported being pushed back constantly. Slag pots were reported available on seven to eight weeks delivery. One mitigating factor is the opening up of machining capacity in machine tool manufacturing plants which is helping to speed casting finishing.

The demand for wire rope was reported so far ahead of capacity that orders must now be placed 6 to 12 months in advance. New producing facilities are reported being brought in. Production requirements, however, have risen from about 15,000 tons per month in 1942 to 25,000 tons per month at present. Six months' lead time is required for average steel mill sizes and grades of wire rope.

**Chain** deliveries are reported from 6 to 10 months behind schedule depending upon the size. WPB has encouraged a number of plants in Maine, Vermont and Michigan formerly producing chain for the granite industry to convert to commercial chain. The output of these plants, however, was said to be of little use to steel mills.

Simplification of chain specifications and an attempt to limit the uses of chain through the specification of wire rope in its place has somewhat eased the tight situation. Both shortage of capacity and manpower are blamed for the present chain shortage.

An attempt to obtain diversion from wrought iron chain to alloy steel chain has also been put into effect. However, there are only three producers of alloy steel chain, having a limited capacity.

•

## PR 7 Establishes Standard Certification

*Washington*

• • • **WPB has estimated** that 150 special forms of certification which manufacturers heretofore have been required to use will be eliminated by provision made on Monday to simplify procedures regarding the placement of certifications on purchase orders and other documents. It has adopted a standard certification in Priorities Regulation 7, which is the same as the one prescribed in CMP Regulation 7, which may be used in most cases instead of certifications required to be placed on, or accompany purchase or delivery orders.

•

## WPB to Release Restricted Information

*Washington*

• • • **Statistical** material on industry heretofore treated as restricted war information soon will be made available to American business for planning present and future operations, says Donald M. Nelson, WPB chairman. This action will release a large amount of past and current data originally collected for confidential use of war agencies. The facts will include figures on production or shipments, material consumption, inventories and resources, fabricating capacity and utilization, employment, impending bottlenecks, new materials, substitutions, and general trends. The figures will be concerned with lines of industry and types of products, but not operations of individual companies or plants. The WPB chairman remarked that prosecution of the war had reached the point where some of the rigid restrictions may safely be removed.

# Ore Carriers Granted 8 Per Cent Additional Increase; New Rates Listed

*Washington*

• • • To be added to the previously authorized special post-season increase of 31.25 per cent applicable during December, OPA last Friday granted an 8 per cent increase in maximum rates for the transportation of iron ore on the Great Lakes. This increase may be applied as of Aug. 31, the date carriers petitioned for a 10 per cent rate increase and expires Dec. 31 unless extended or modified. The 8 per cent increase was allowed, OPA said, to take care of a substantial rise in operating costs since the General Maximum Price Regulation "froze" rates as of March, 1942.

The increased rates apply to the transportation of iron ore on the Great Lakes by carriers for hire other than common carriers. Private carriers are not subject to the rates except to the extent to which they may transport iron ore for hire.

The new ceiling rates in cents per gross ton of 2240 lb. follow:

| | |
|---|---|
| From Lake Superior ports west of Marquette, Mich., to Lake Erie ports or ports in the south end of Lake Michigan | 86.4 |
| From Marquette, Mich., to Lake Erie ports or ports in the south end of Lake Michigan | 77.8 |
| From Escanaba, Mich., to Lake Erie ports | 64.8 |
| From Escanaba, Mich., to Lake Michigan ports | 51.8 |

An unloading charge of 14c. per gross ton, generally made, is not included in these rates and may be added.

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# New MRO Ratings Lead Control Easing

*Washington*

• • • Now that critical materials have been mastered through stockpiling, conservation, and allocation, WPB is prepared to release some steel, copper and aluminum and other essential materials to keep the civilian machinery in repair. To effect this a new regulation known as CMP Reg. 9A has been issued which brings together under one control the allocation of materials for making repairs.

This will include farm machinery repair shops, blacksmith shops, electricians, radio repair shops, plumbers, refrigeration repair shops, boiler repair shops, motor rewinders, electrical contractors, automotive repair shops, upholstery repair shops, bicycle repair shops and carpenters. The regulation will apply to repair shops which are owned by persons for whom the repair work is done if that person can segregate the purchases of his repair shop from his other purchases.

Under the regulation each such repairman may buy in each calendar quarter up to 20 tons of carbon and alloy steel, a total of 500 lb. of copper and copper base alloy brass mill and foundry products and 20 lb. of aluminum. The forms in which these materials can be purchased by repairmen are noted in a supplemental list appended to the regulation, these including such forms as normal repairmen require the products.

In addition, refrigeration repairmen, domestic appliance repairmen, electricians, electrical contractors and radio repairmen may buy $150 worth of copper wire or one-eighth of what they used in making repairs in 1941, whichever is more. A repairman may buy as much other material and repair parts as he needs for his maintenance and repair work.

For this purpose a CMP allotment symbol of V-3 can be used, or in case of non-controlled materials, a preference rating of AA-3. But the repairman must sign a certificate pledging the use of the materials for the purposes for which approved. The War Production Board may authorize a repairman to do work primarily of an industrial nature and therefore to buy up to 2000 lb. of copper wire and a total of 2000 lb. of copper and copper base alloy brass mill and foundry products, and to use a preference rating of AA-2, but such permission will only be given upon certification. Should a repairman require more than these maximum of materials he will have to file application with WPB.

## Priority Changes

L-36—Amended order permits an 8 per cent increase in annual production of umbrella frames and doubled production of repair parts. (11-25-43)

•

L-114—Amended order eases restrictions on the use of aluminum in certain types of safety equipment. (11-22-43)

•

L-199—Int. 2 includes tanks produced for underfired storage water heaters in the definition of "tank" in Order L-199, and the restrictions of the order apply to such tanks. (11-22-43)

•

L-211—Sched. 13, as amended, makes clear that all kinds of piping and tubing used for structural or mechanical purposes are not covered by the schedule. (11-26-43)

•

L-326—Order reduces the varieties of solid tooth circular saws, and wide and narrow band saws from approximately 5400 to 1404. (11-23-43)

•

M-162—Amended order provides that platinum scrap may not be held in excess of the amount produced in 30 days and further provides that no processor or consumer may have an inventory in excess of final product deliveries during a 60-day period. (11-22-43)

•

M-360—Order acts to standardize scheduling procedures for aircraft components. (11-22-43)

•

P-142—Int. 1 explains that if delivery of orders for transportation equipment MRO materials were properly placed and rated under P-88, which order was revoked by P-142, but were not delivered, they may be rerated to the extent that similar materials are authorized on Form WPB-2585, pursuant to P-142. (11-24-43)

•

P-148—Order simplifies the procedure for procurement of materials used in drilling and repairing water wells in rural and suburban districts. (11-23-43)

•

• Amendment of List B of Priorities Reg. 3 allows woodworking machinery as defined in Order L-311 and costing no more than $50, may be purchased through blanket MRO procedures. (11-27-43)

•

• Priorities Reg. 7 has been revised to greatly reduce the paper work, and simplify and standardize the requirements on certifications. (11-27-43)

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## CMP Developments

• Reg. 5A, as revised, modifies rules governing use of MRO procedures by institutions and government agencies and conforms to recent WPB policy changes. (Release No. WPB-4623)

•

• Dir. 30 to Reg. 1 rules that brass mills are no longer prohibited from accepting orders for production of copper water tubing which have not been specifically authorized by WPB. (Release No. WPB-4622)

•

• Reg. 9A establishes procedures under which persons engaged in the business of making repairs may obtain controlled materials and other materials and parts. (Release No. WPB-4617)

•

• Reg. 9 has been amended, changing its controls over the allotment of copper wire to retail outlet. (Release No. WPB-4617)

•

## Price Briefs

• Amdt. 7 to Order A-2 of MPR 188 adjusts prices on tank heaters and boilers to cover costs. (Release No. OPA-T-1477)

•

• Amdt. 58 to RSR 14 allows, for a limited period, the "iron ore fleet" to increase its maximum rates for the transportation of iron ore on the Great Lakes by eight per cent. (Release No. OPA-3536)

# M-360 Issued to Standardize Scheduling of Aircraft Components

***Washington***

• • • **Action to standardize** scheduling procedures for aircraft components has been taken by the WPB with issuance of a new General Scheduling Order, M-360.

The order permits scheduling of only those aircraft components, parts, and sub-assemblies for which responsibility is assigned by WPB to the aircraft resources control office.

The Aircraft Scheduling Unit at Wright Field, Dayton, Ohio, has, for the past year and a half, directed a scheduling procedure designed to balance requirements and production of aircraft components with airplane production. Order M-360, which has been approved by the aircraft production board, will unify and standardize this scheduling by ASU, under the direction of ARCO, along the following lines:

Purchasers will state requirements to the ASU on form WPB-3362, giving detailed information relating to requirement and procurement schedules for each aircraft component. The ASU will check these requirements against available bills of materials, against the purchaser's authorized production schedule, and in the light of airframe, engine and propeller schedules established by the joint aircraft committee. At the same time, the requirements will be checked with suppliers, who will indicate their proposed schedule of shipments on the WPB-3362's.

The proposed schedule of shipments, when filed with the ASU becomes a frozen schedule under the terms of Priorities Regulation No. 18.

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# Contract Commission Rules Termed Lax

***Washington***

• • • **No commission on** contracts shall be allowed as an item of cost by contract renegotiators unless the person to whom the commission is paid is a "bona fide established commercial or selling agency maintained by the contractor for the purpose of securing business" under the 1944 Revenue Bill passed by the House of Representatives, Nov. 24.

The bill establishes standards to be followed by Price Adjustment Boards. (THE IRON AGE, Nov. 18, page 78) The new standards have been severely criticized by a number of representatives as being too lax and subject to varied interpretation.

The standards are:

1. Efficiency of contractor with particular regard to attainment of quantity and quality production, reduction of costs and economy in the use of raw materials, facilities and manpower.
2. Reasonableness of costs and profits with particular regard to volume of production and normal pre-war earnings.
3. The amount and source of public and private capital employed and net worth.
4. The extent of risk assumed, including the risk incident to reasonable pricing policies.
5. Nature and extent of contribution to the war effort, including inventive and developmental contribution and cooperation with the government, and other contractors in supplying technical assistance.
6. Character of business, including complexity of manufacturing technique, character and extent of subcontracting and rate of turn-over.
7. Such other factors the consideration of which the public interest and fair and equitable dealing may require.

The prohibition against the payment of commissions applies to percentages, brokerage or contingent fees.

•

## DPC to Store Unassigned Tools

***Washington***

• • • **WPB is endeavoring** to effect a redistribution of tools which are now released by the cut-back of various war production programs. In case these tools are not assigned, they must be stored with the Defense Plant Corp. Manufacturers have been sent the following notice by John S. Chafee, Director of the Tools Division, telling how such unassigned pool orders are to be reported:

In order that the records of the Tools Division may be consistent, it is desired that the following procedure be adopted in handling shipments of Unassigned Pool Orders for Defense Plant Corp. storage. Such machines are to be reported as shipped during the month in which they are shipped or transferred to DPC storage with the notation that these machines were shipped to DPC storage. It is desirable that this note be made in order that our records of unfilled orders conform with shipments and unfilled firm orders. Machines shipped to DPC storage should not thereafter be carried as Unassigned Pool Orders.

•

## Inventory Limitations Affect Separate Stocks

***Washington***

• • • **Inventory and small** order provisions of WPB orders will apply to separate operating units of the same company if it has been the practice of an individual plant, branch store, division or other operating unit normally to keep separate inventory from the rest of the corporation. In issuing Interpretation 8 to PR 1, WPB points out that although another unit may have exceeded an inventory limit, this does not prevent a unit which has not exceeded it from acquiring additional inventory within the limit. Also, if a WPB order provides for exemption for small purchases, an operating unit which normally buys separately need not consider purchases made by other units in determining whether it comes within the exemption.

•

## WPB Field Processing To Be Broadened, Increased

• • • **Field officers** of WPB will shortly be given much expanded authority in the processing of applications for production machinery and processing equipment and also for construction. By an order just issued they will process equipment applications up to $10,000 in value, as they are now doing in the case of construction. It was also stated that field jurisdiction over construction projects will shortly be expanded up to $25,000 in value and at a later date raised to $100,000.

## COMING EVENTS

Nov. 29 to Dec. 3—American Society of Mechanical Engineers, New York.
Dec. 6 to 11—19th Exposition of Chemical Industries, New York.
Dec. 8, 9, 10—National Association of Manufacturers, New York.
Jan. 10 to 14, 1944—Society of Automotive Engineers, Detroit.
April 2 to 5—The American Ceramic Society, Inc., Pittsburgh.
April 12 to 15—The Electrochemical Society, Inc., Milwaukee.

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30" Heavy Duty Lathe with 13" Hole in Spindle

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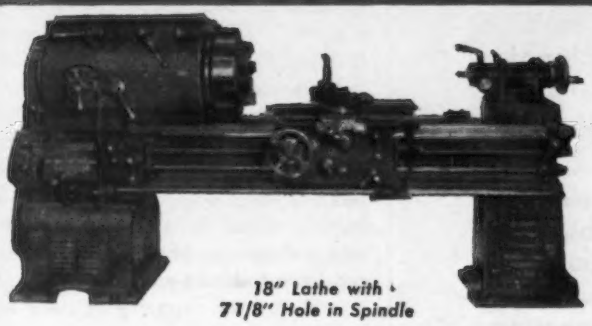
*Perform Important Operations in 1/7th the Time of Previous Practice*



18" Lathe with 7 1/8" Hole in Spindle

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| | | |
|---|---|---|
| SMALL—18" | Up to | 7¼" Hole |
| MEDIUM—24" | Up to | 12" Hole |
| LARGE—27" | Up to | 13" Hole |
| LARGE—30" | Up to | 14" Hole |
| LARGE—36" | Up to | 16½" Hole |

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## Voorhees Hits at Notion Business Is Remote from Public

• • • **Business is** not a thing apart—it is simply the general public engaged in its own service of supply, stated Enders M. Voorhees, chairman of the finance committee, United States Steel Corp., in an address Sept. 21 in New York before the Controllers' Institute of America.

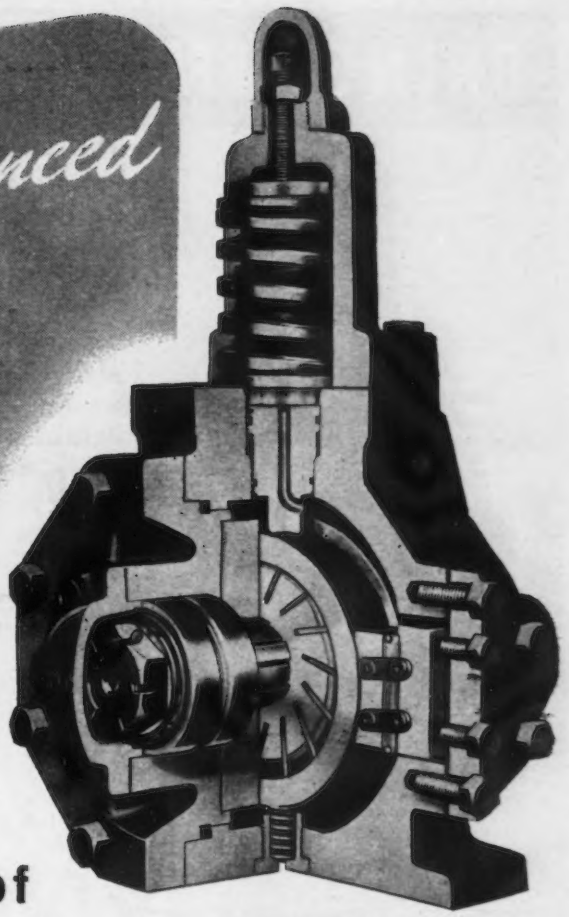
"We hear a great deal about production for use as being somehow more desirable than production for what is called profit," he said. "Translating that into a simple problem of bookkeeping, we are asked to believe that if everyone produced at less than cost—that is, a loss—we should all be happier. If we remove the dollar sign from a business loss, it turns out that somebody somewhere has rendered services without getting anything in return. This means that this somebody must have not only a benevolent disposition but also must ultimately have the ability to produce and live on thin air. If the art of producing for use involves giving without receiving, it involves the breeding of a race that can live on unrationed air. It is scarcely a compliment to us that lack of accounting clarity has made it possible gravely to discuss social theories which, if run through double-entry bookkeeping, would show up as socially impossible without the aid of an alchemy that could turn a loss into a profit. We, as bookkeepers, possess the means to show that many of the movements which are blatantly labelled progressive are viciously retrogressive, for they involve taking away and not replacing. But so cramped has our style become that we are leaving the social field to the bureaucrats and reformers who, because they do not have to make ends meet, are limited only by the capacity of their imaginations.

"You will please note that I have not yet said that we should 'present the case for business' or 'for free enterprise.' We who are in business are not litigants in a great cause, with the general public as our adversaries. Business is not a thing apart. It is simply the same general public engaged in its own service of supply; and business can no more live in a position adverse to those it supplies than the heart can take a position adverse to the lungs. Most of us are both producers and consumers. There is no one who always sells and never buys. The notion that business is

*Hydraulically balanced*

# RACINE

## VARIABLE VOLUME OIL HYDRAULIC PUMPS



## Gives smooth non-pulsating flow of oil in modern hydraulic circuits

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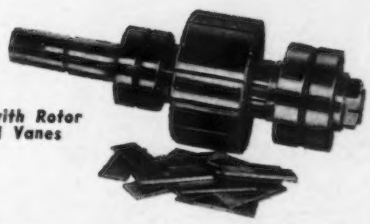

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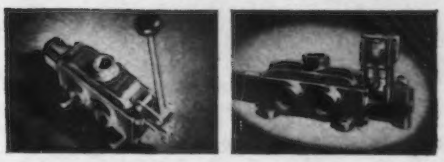
Racine Pumps and Valves are the heart of any modern hydraulic circuit. Any operation such as feeding, bending, molding or pressing can be efficiently performed with Racine Pumps. Write today for complete data and prices. Address your request to Dept. I-P.

## RACINE

## oil hydraulic valves



Exclusive "Balanced-Piston" "Sleeve Type" construction for smooth oil-cushioned control of hydraulic circuits. All interior working parts are hydraulically balanced. Piston lands are grooved to minimize hydraulic set. Available in a wide range of portings with various control devices—sizes ⅜" to 1½".

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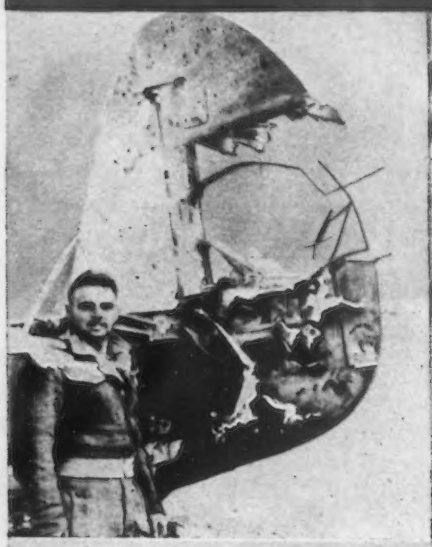
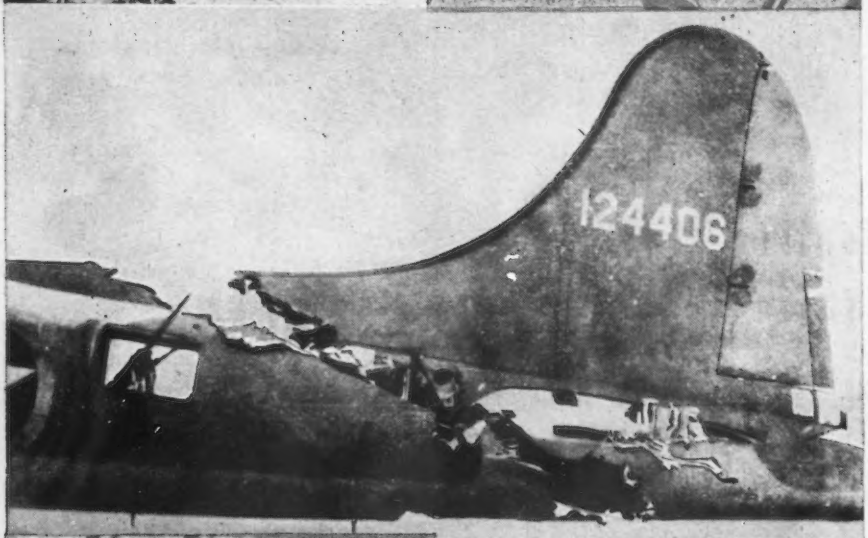


The safety of our daring airmen, as well as the safety of our country depend upon the ability of American built planes to accomplish their missions and return. The most important factor in the amazing superiority of our war planes is their ability to stay in the air and "bring 'em back alive" despite extensive damage. Certainly the countless fastenings which hold these planes together share equal credit with the superb materials and precision American craftsmanship that produce their structural members. Among these rivets, bolts, nuts, screws and special fastenings are millions of HOLTITE precision fastenings — and we are proud of the vital part they play in bringing back America's war birds alive.




The lives of our fighting men hang by a thread, and we are determined that any screw made at Continental will be the best that science and skill can devise.

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Center: Boeing Flying Fortress.
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can be an independent system o power either to take continuously from or supply continuously to th community is absurd. It supposes that business can live in a vacuum— free to do as it pleases about prices or any other matter.

"Wages and taxes which increase faster than the slack taken up by efficiency must be paid for by the customer—that is, by the very people who think they are being benefited by them. The public and private provisions for old age, accident, unemployment and other liabilities are business costs. They are paid through increased prices and decreased purchasing power. Now I am concerned only with pointing out that business enterprise is not an originating source of funds; it is only an intermediate paymaster and, if its income from operations is less than its outgo, the difference can be made up only by selling off, directly or indirectly, the facilities which must be used for production—that is, by dipping into the seed corn. The relations are not changed by the size of the operations.

**"Exactly defining** the function of a business unit is becoming of extreme importance in these days when so many post-war worlds are being constructed with alternate bricks of fact and fancy. The fancies—and a whole social fabric is being woven out of them—conceive of the paraphernalia of production and distribution as constituting in themselves the source of prosperity. In times of general prosperity, it is true, the machinery of production and distribution goes into high gear and in so doing requires the employment of so large a number of human beings that nearly everyone who wishes work may find it at fairly satisfactory wages. This has brought about the widespread illusion that the whirring of the machinery causes the prosperity and the employment. From this illusion is deduced the theory that it is the social obligation of the owners of the machinery to keep it whirring and to preserve a high level of employment. It is declared, with a finality that brooks no argument or questioning, that when the owners shut down their machinery and discharge men they are solely actuated by the vile purpose of promoting scarcity and preserving profits. It thus appears that depression and unemployment derive from the cupidity and incompetence of private owners and that the answer is to be found in the selfless competence of the perfect bureaucrats of the perfect state. The complete employment of our fa-

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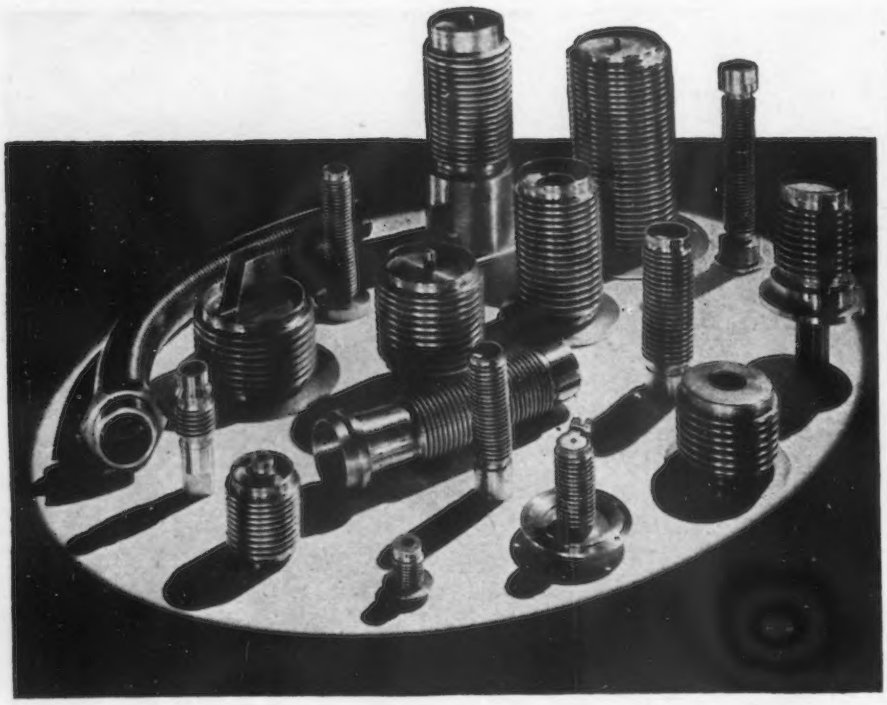
cilities in war is offered as conclusive proof that it is within the power of the State to provide complete employment in peace. We are told that, the State having demonstrated its ability to employ, the people will not again tolerate any condition which involves less than a high level of employment and at a high level of wages. It follows, so it is said, that if private ownership cannot justify itself by maintaining these high levels, the State in its ripe competence and even riper confidence will take over. It is rather odd to discover that many of those who call themselves business men and are presumed therefore to be versed in commercial accounting, subscribed to the fundamental illusion that we can act as if we have large orders in hand when we have only small orders and therefore find no difficulty in solemnly averring that business has the responsibility of learning how to go forward while operating in reverse—or else.

"**The 'or else'** connotes that the perfect state lies ready and willing to take over. If that were the case and if only the cupidity of private owners stood between us and perfect material happiness I am sure we should all stampede to the arms of the perfect state. But those of us who are in the management of industry know that we are only economic servants, that we possess no power to employ except as we are employed, that it is simply not in the wood to preserve, much less to increase, earnings by curtailing production, and that we are equally helpless with our employees against the primary power of our customers. We know from our accounts that we can produce and exchange our products only as others produce and exchange with us.

"All of that would be wholly apparent if we simply and intelligibly presented our financial accounts; also it would be wholly apparent that if the State stepped into our shoes it would be in no better case than we are. Government has the force to compel, but its only magic is the seeming magic of taxes and the money printing press and that is good only for a short series of one-night stands. Let us try to fulfill the responsibilities which we have in the faith that thereby we shall all learn the ways of a material organization in which every man gets what is squarely coming to him. By that I mean each gets the equivalent of what he produces — that is the American ideal."

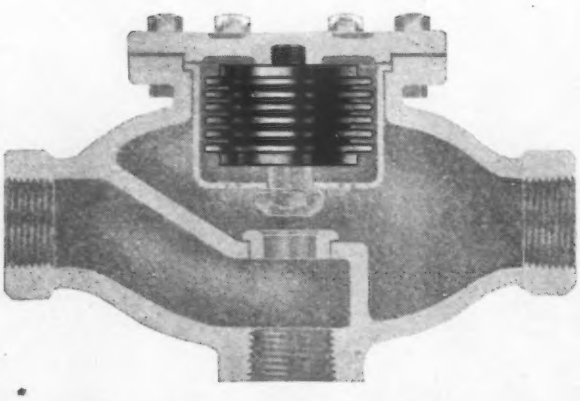
CMH

Stainless Steel Bellows

Wherever stainless steel's corrosion resistant qualities and temperature values are required in bellows service, CMH unimetal **circular seam welded** assemblies are filling that need.

No Solder or Flux Required

Long lengths of CMH Bellows are standard production; strength is further enhanced with **multiple ply** assemblies when needed.



*Ask for engineering recommendations on specific applications.*

**CHICAGO METAL HOSE CORPORATION**

**General Offices: MAYWOOD, ILLINOIS**

***Factories: Maywood and Elgin, Illinois***

# BRASS *is the only currency in which you can do business with Hitler*

War is a business in which sub-standard quality of product is paid off . . . not with a bored apology at the Complaint Department . . . but in instant, bloody, defenseless death. Bombs that dud, shells that miss fire and jam guns . . . these are *counterfeit currency* that carry frightful penalties.

Hitler knows this, and Tojo. But so do the white men, better than either of these accomplished assassins. Back from the battlefronts come repeated reports of the superiority of U. S. *ammunition* . . . its dependability, and the fact that it's *sure fire* when the chips are down. These reports should be a powerful comfort and encouragement to the family of every American man and woman under fire.

To us here at Bristol, it's as simple as this: We like to be able to sleep when we get to bed, because we need it at the speed we're going. So we strictly see to it that every run of Bristol Brass sheet, rod, and wire is made the way it should be made by a brass mill that's been in business for 93 years, and served U. S. munitions makers through five wars. We hope this war is the world's last . . . we're doing our level best to make it so. *And we're not losing any sleep!*

**The BRISTOL BRASS Corporation**

MAKERS OF BRASS SINCE 1850 AT BRISTOL, CONNECTICUT

# Prevent accidents with this ASBESTOS Oil and Grease Absorbent

**Every time an American workman is injured as the result of slipping and falling on an oil or grease soaked floor, Hitler and Hirohito have real cause to celebrate. Yet these frequent accidents—so costly in money, time, and manpower—need not happen. You can help prevent them with CAREY ASBESTO-SORB.**

**A free trial will convince you! Write us today for full information and a sample of ASBESTO-SORB for making your own test. Address Dept. 26.**

## Carey ASBESTO-SORB

ASBESTO-SORB is an improved, inexpensive, super-efficient compound that absorbs oil and grease — literally "eats it up." ASBESTO-SORB provides a non-skid, non-slip floor surface that's safe, greatly lessening accident danger. ASBESTO-SORB is used dry; nothing to add. It's harmless to floors, hands, shoes, clothing. Economical—can be used over and over again. Quickly spread by hand . . . easily swept up.

*FIRE SAFE . . . another quality highly important to you and the war effort. ASBESTO-SORB is rated "Class I, Non-Combustible" by Underwriters Laboratories, Inc.*

is excellent for soaking up acids around pickling vats, storage battery spillage, cleaning solutions, etc.

When spread as a mat, ASBESTO-SORB serves as a cushion underfoot. It doesn't "ball up" and is not tracked around the plant.

PROMPT SHIPMENTS IN 50-LB. BAGS FROM 45 BRANCH WAREHOUSES.

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Dependable Products Since 1873.
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## OPA Clarifies Export Pricing of Ferroalloys

• • • **The port of exit is regarded as the delivery point for determining the maximum price on export sales of chromium.**

Both Maximum Price Regulation No. 405 (Ferrosilicon and Silicon Metal) and No. 407 (Ferrochromium and Chromium Metal) provide that export prices shall be determined in accordance with the provisions of the Second Revised Maximum Export Price Regulation. Sections 2 and 3(b) of this Regulation provide that the producer's maximum price on a sale to an exporter or on a direct exportation is the applicable domestic price plus or minus certain adjustments.

Maximum Price Regulations No. 405 and No. 407 establish maximum prices according to the zone in which delivery is made, the producer allowing freight to destination. While, in the case of an export sale, the actual consuming point is not within any specified zone established by the Regulations, the Port of Exit should be regarded as the delivery point for the purpose of determining what domestic maximum price should be used.

## DPC Awards

**Ford Motor Co.**, Dearborn, Mich., to provide additional equipment at a plant in Michigan at a cost in excess of $675,000, making a total commitment of more than $89,450,000.

**Electro Metallurgical Co.**, New York, to provide additional plant facilities in Ohio at a cost in excess of $870,000, making a total commitment of more than $9,800,000.

**Vega Aircraft Corp.**, Burbank, Cal., to provide additional plant facilities in Los Angeles county, Cal., at a cost in excess of $400,000, making a total commitment of more than $7,670,000.

**N. A. Woodworth Co.**, Ferndale, Mich., to provide additional facilities at a plant in Michigan at a cost in excess of $50,000, making a total commitment of more than $4,300,000.

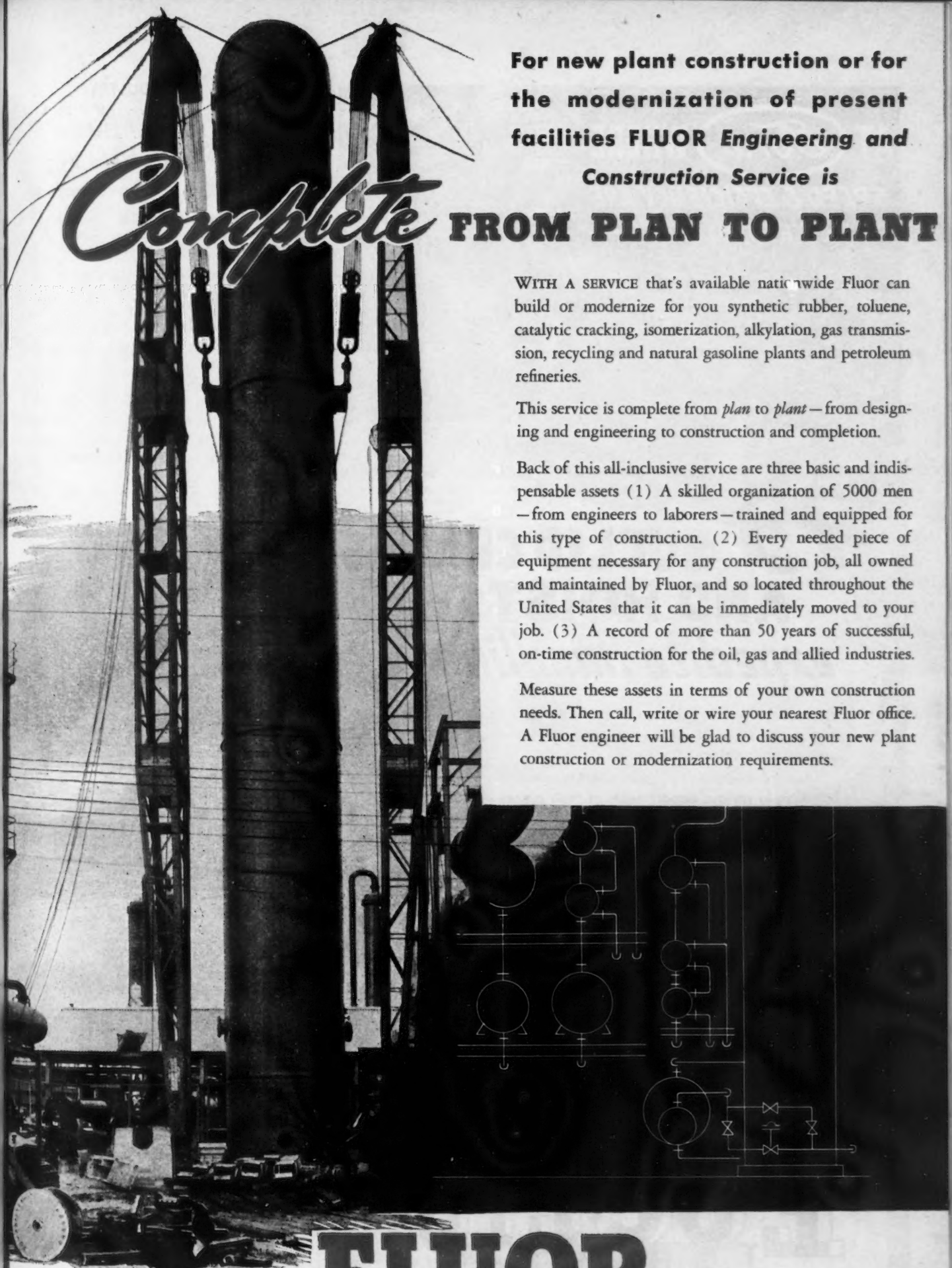
**A. G. A. Metal Tube Co.**, Elizabeth, N. J., to provide equipment for a plant in Ohio at a cost in excess of $185,000.

**Inland Navigation Co.**, Vancouver, Wash., to provide additional transportation facilities in Washington at a cost in excess of $180,000.

**Indian Run Fuel Co.**, Bellaire, Ohio, to provide plant facilities in Belmont County, Ohio, at a cost in excess of $150,000.

**Columbia Machine Works**, Berkeley, Cal., to provide machinery and equipment at a plant in Los Angeles County, Cal., at a cost in excess of $35,000.

**The DPC** has authorized an increase in its contract with American Propeller Corp., Toledo, Ohio, to provide additional equipment at a plant in Ohio at a cost of approximately $900,000, resulting in an over-all commitment of approximately $12,400,000. American Propeller Corp. will operate these facilities, title remaining in Defense Plant Corp. The company, a subsidiary of the Aviation Corp., manufactures hollow steel propeller blades from seamless steel tubing.



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5 to 10 TON Cranes
in
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## Another Helpful List Of Patents Held By U. S. Government

• • • **Below is** another installment of seized patents pertaining to the metalworking industry. These patents have been taken over by the U. S. Government and are available to firms which obtain a license from the Alien Property Custodian. Starting with the issue of Nov. 4 (page 95) THE IRON AGE has been publishing lists of the confiscated patents each week, with full information about their usage and possibilities. In the issue of July 8 in the news section, lists of seized patent applications were published.

The seized patents are grouped in classes. In the lists below, the subclass number is given first in parenthesis, followed by the patent number, description of the patent, the inventor's name and his nation, and the date the patent was issued.

### *Class 257—Heat Exchange*

**(1) 1,760,884.** Heating device of the class in which a heat accumulator comprising a metal block is heated externally and is provided with channels or passages filled with a temperature equalizing medium such as water, alcohol, or ammonia which is partly evaporated on supplying heat to the heat accumulator. A. Pais, Rumania. 6-3-30.

**(1) 1,769,752.** Heating device with heat accumulators. A. Pais, Rumania. 7-1-30.

**(1) 1,817,394.** Heating device with heat accumulators. A. Pais, Rumania. 8-4-31.

**(1) 2,004,042.** Process of cleaning heating surfaces. O. Eberhardt, Czechoslovakia. 6-4-35.

**(2) 2,001,784.** Apparatus for utilizing heat of condensates. W. Hofmann, Germany. 5-21-35.

**(6) 1,808,921.** Metallic filling for cold accumulators. M. Frankl, Germany. 6-9-31.

**(6) 1,958,666.** Device for drying and roasting granular material. L. Honigmann, Germany. 5-15-34.

**(8) 1,838,260.** Central cooling plant which usually serves for heating, may be used in hot weather, after disconnecting the heating boiler, for cooling living, working, or other rooms. E. Jacob, Germany. 12-29-31.

**(26) 1,803,156.** Air-cooled condenser for steam-driven vehicles. R. Wagner, Germany. 4-28-31.

**(28) 1,649,482.** Vapor condensing apparatus such as steam condensers of the countercurrent flow type. C. Metzger and E. Luetschen, Germany. 11-15-27.

**(39) 2,107,478.** Air-cooled surface condenser for stationary steam engines and turbines operating under high vacuum. O. Happel, 2-8-38.

*Copyright, 1943*

**(43) 1,650,872.** Surface condenser wherein the direction of flow of the cooling water in the condenser can be changed. C. Hulsmeyer, Germany. 11-29-27.

**(46) 2,057,416.** Steam heating plant which, by means of suitable provisions, permits of varying the heating effect at will. G. Castellazzi, Italy. 10-13-36.

**(50) 1,699,919.** Liquid heater and more particularly a heater in which the liquid trickles down a plurality of superimposed heating elements which may be tubular and heated on the inside by water of suitable temperature. O. Prollius, Germany. 1-22-29.

**(78) 1,999,081.** Cream ripening vat provided with a stirrer, within which a heat-exchanging medium is made to circulate. A. Broer, Germany. 4-23-35.

**(79) 1,936,293.** Heat exchanger consisting

# Rodine

## Makes Pickling Efficient

*This steel surface photograph (magnified) was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.*

*This surface pictured was pickled exactly like the other except that RODINE was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred.*

All steel requires pickling to remove scale whether the fabrication is for steel plates for battleships, airplane parts, motor vehicle or ordnance parts.

RODINE in the pickling bath confines the acid action to removing the scale and inhibits acid action on the clean metal. This controlling action of Rodine in preventing the acid from dissolving clean steel, saves acid by eliminating a needless waste. The life of the pickle bath is increased and better pickling is accomplished.

**RODINE**

- **Saves Acid**
- **Saves Steel**
- **Prevents Overpickling**
- **Minimizes Blistering**
- **Reduces Embrittlement**
- **Diminishes Noxious Fumes**

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Please send me general Technical Service Data Sheet on

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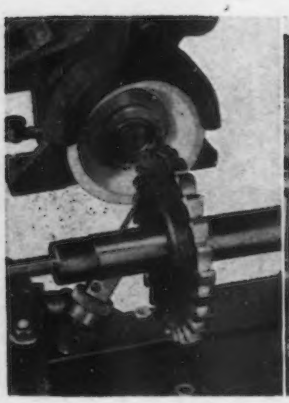
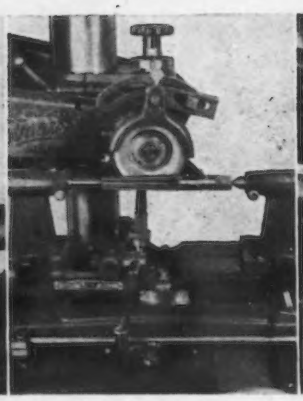
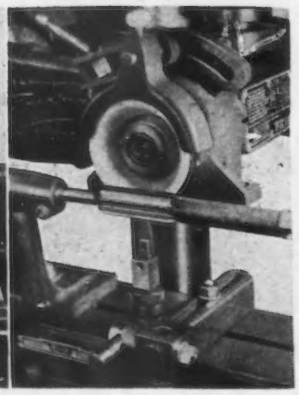
E-12



Set-up in grinding a side milling cutter.



Grinding a taper reamer.



Grinding a straight-toothed machine reamer with a cup wheel.

**Tool sharpening is *simpler, easier, cheaper, and extremely accurate*.. with the new**

# Delta Tool and Cutter Grinder

Here is the latest development in Tool & Cutter Grinder design, combining the best features of units of this kind — and its low cost permits its use in all types of shops where accurate grinding must be done.

The new Tool & Cutter Grinder attachment has been added to the famous Delta Toolmaker Surface Grinder (machine may also be used as a surface grinder).

Almost any conceivable angle can be ground. Delta construction features assure perfect alignment and freedom from play, for extreme accuracy over a long, useful life. The machine itself is substantially built (weight over 700 lbs.) and machined to very close tolerances.

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M6B

***Specifications***

Wheels must have 1¼" hole.
Table surface 5¾ x 13".
Traverse feed, one graduation is .001".
Maximum vertical adjustment of wheel by means of micrometer is ⅜", each graduation is .0005".
Spindle speeds with a 60 cy 1750 R.P.M. motor are 3200 and 4200 R.P.M.

Price f.o.b. Milwaukee without wheels, motor, or switch.. **$370.00**

Priority required, A-1-A or better, under Restrictions of Limitations Order L-237.

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of an apparatus for heating solid, liquid or gaseous substances by the heat of condensation of heating media preferably naphthalene having a lower specific heat of condensation and a higher boiling point than water. E. Duab, Germany. 11-21-33.

**(95) 1,768,156.** Cooling drum of the type in which cooling medium flows through the annular space between a double walled drum. W. Schroder, Germany. 6-24-30.

**(96) 1,679,685.** Device for the cooling of fatty emulsions or the like. W. Schroder. Germany. 8-7-28.

**(98) 2,095,363.** Drum type drier for drying paste-like or dissolved substance. E. Kaessmann, Germany. 10-12-37.

**(102) 1,764,535.** Apparatus for the exchange of heat wherein the rotatable hollow radiator is arranged in a casing and acts as a fan. H. Simmon, Austria. 6-17-30.

**(108) 1,874,996.** Steam heated boiling vessel having at least two jackets secured to the bottom of the vessel forming a central jacket and an outer jacket, said jackets adapted to receive a medium for heating the material in the vessel. A. Heller, Germany. 8-30-32.

**(108) 1,919,179.** Apparatus for removing water film from heat transmitting walls. H. Wiltsch, Germany. 7-18-33.

**(112) 1,774,554.** Apparatus for the recovery of dry distillation material from hot gas currents consisting in conducting the over gases through dust separators which are provided with means for precipitating the suspended dust without moistening or like operations. L. Honigmann and F. Bartling, Germany. 9-2-30.

**(125) 1,827,568.** Automobile radiator consisting of a plurality of removable and interchangeable cooling chambers or tube sections adapted to be independently shut off from the cooling system. A. Donadio, Italy. 10-13-31.

**(126) 1,705,143.** Water-cooling radiator for use in heavy vehicles. E. Schweter, Germany. 3-12-29.

**(129) 1,717,237.** Means for cooling liquids or fluids and consists essentially in passing the liquid to be cooled, by centrifugal force and in thin layers along the inner walls of rotating cylinders, which are of a good heat-conducting material (metal) and the outer walls of the said cylinders are subjected to the influence of a cooling medium (water or air). H. Mager, Austria. 6-11-29.

**(192) 2,240,047.** Device for holding and centering a body placed on a swiftly rotating spindle by means of independent members acting in a radial direction, more particularly adapted for spinning, twisting and like machines. L. Marzoli, Italy. 4-29-41.

**(130) 1,794,263.** Radiator for motor vehicles comprising elements formed by sheet metal strips bent in zig-zag shape and connected two by two at their vertical longitudinal edges to form water conduits. V. Valletta, Italy. 2-24-31.

**(137) 1,668,537.** Air heater and more especially a heater of the circulation type in which a heating element fed with steam or other heating medium, as an electric current, extends across a chamber through which air is drawn or forced by means of a fan or the like. M. Lurken, Germany. 5-1-28.

**(137) 1,750,094.** Hand and face drying device. P. Emmrich, Germany. 3-11-30.

**(139) 2,001,186.** Heat exchangers such as radiators for power plants on aircraft, and more particularly heat exchangers made of light metal or a light-metal alloy throughout. C. Dornier, Germany. 5-14-35.

**(150) 1,860,573.** Radiator of cast material, particularly cast iron, for heating buildings and the like. S. Deutsch, Austria. 5-31-32.

**(161) 1,951,968.** Device which serves for the tightening of the joints between the elements of radiators for central heating. S. Deutsch, Austria. 3-20-34.

**(172) 1,809,538.** Heat utilizer in which the unused flue gases passing off into the chimney in known manner in furnaces and stove-heating, are utilized entirely. H. Weisshaar. Germany. 6-9-31.

**(191) 2,056,603.** Rotary shutter mechanism for the charging and discharging openings of the rotary and non-rotary containers used in machines for treating materials of all kinds, for example, mixers, edge runner mills, roasting apparatus, etc. L. Eirich and J. Eirich. Germany. 10-6-36.

**(197) 1,650,122.** Vacuum pan and more particularly a vacuum pan used in the manufacture of sugar wherein the flow of the liquid to be heated is improved. A. Grantzdorffer. Germany. 11-22-27.

**(200) 1,767,697.** Outlet coupling device for

# Hardening NE Steels

WITH REJECTS LESS THAN 1%

of

JONES & LAMSON MACHINE CO.

Springfield, Vt.

◀ Neutral Hardening Section. Operator is removing jack shafts from the Ajax-Hultgren furnace. Jack shafts are suspended from adjustable fixture support brackets by hooks.

▼ Close-up, showing special jigs and fixtures in use for neutral hardening operations at Jones & Lamson Machine Company.

Jones & Lamson lathes, thread grinders, radial and tangent die heads, chasers, comparators, involve 90 different analyses including most NE steels, over 40,000 heat treated parts. . . . The Ajax electric salt bath furnace method is used for hardening these steels. After 13,000 hours of operation without discernible pot wear or maintenance, at temperatures from 1400° to 1600° F., Lester J. Sheehan, production metallurgist, has this to say:

"It has been our observation that the salt bath introduces fewer variables than any other method, providing all recording devices are checked, the bath kept circulating for temperature uniformity, and kept chemically neutral by proper cleaning. . . .

"Distortion, decarburization, hardness variations are eliminated. During a representative period of operation the salt bath furnace produced over a quarter of a million pounds of heat treated parts, with less than 1% average rejects."

Write for the full story of Neutral Hardening, and Send for Catalog 107-A.

*(Top of Page): Jones & Lamson worm shafts at the upper left have been carburized, ready for hardening selectively at the worm end. The clutch shaft (NE 8749) is to be straightened from the quench at 550°. The two pilot bars are shown as quenched in brine. They are X1315 steel, carburized to .060". The two jack shafts of NE 8713 steel (carburized) have been quenched in oil. All parts achieve maximum hardness obtainable for their respective analyses and treatments.*

**AJAX ELECTRIC CO., FRANKFORD AVE. AT DELAWARE AVE., PHILADELPHIA 23, PA.**

***THERE'S AN AJAX INSTALLATION NEAR YOU!**

## THE AJAX HULTGREN ELECTRIC SALT BATH FURNACE

**ASSOCIATE COMPANIES:**

**AJAX METAL COMPANY,** *Non-Ferrous Ingot Metals and Alloys for Foundry Use*
**AJAX ELECTROTHERMIC CORPORATION,** *Ajax-Northrup High Frequency Induction Furnaces*
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WIDE WORLD PHOTO

KEYSTONE *Wire*

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And . . . while on this industrial march to *Victory*, new methods and vastly increased facilities are being developed at Keystone. So we'll be in a better position than ever to meet the tremendous pent-up civilian demand as soon as the war is over.

**KEYSTONE STEEL & WIRE CO.**
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Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

A little scrap *today* can end the BIG SCRAP *tomorrow*.




therapeutic bath coils. R. Pabst, Germany. 6-24-30.

(206) 1,770,008. Heating device for therapeutic baths. R. Pabst, Germany. 7-8-30.

(205) 1,908,932. Storage tank with heater for storing viscous liquids such as heavy oil and the like. C. Tiburtius, Germany. 5-16-33.

(208) 1,937,226. Apparatus for maintaining the temperature of a fermenting liquid. R. Horch, Germany. 11-28-33.

(211) 1,777,969. Double-walled cooking vessel or boiler adapted to be heated by means of steam. L. Grill, Austria. 10-7-30.

(220) 1,808,663. Boiling and evaporating device for boiling vessels specially for brewer's coppers. H. Kock and K. Quitt, Germany. 6-2-31.

(224) 1,974,876. Heat exchanger for heating air or gases for the purpose of reducing the resistance to flow in the endangered passages as compared with that present in the non-endangered passages or tubes. A. Schack, Germany. 9-25-34.

(224) 1,983,194. Recuperator having metal tubes secured at one end in a stationary air casing or headed and at the other end in an axially movable air casing or header. A. Schack, Germany. 12-4-34.

(225) 2,011,119. Method of protecting heating surfaces against overheating. A. Schack, Germany. 8-13-35.

(229) 1,617,519. Apparatus for superheating steam by means of a high-pressure medium flowing through a tube system arranged in a container through which passes the steam to be superheated. O. Hartmann, Germany. 2-15-27.

(229) 1,768,222. Heat transferrer specially designed for the superheating of steam. R. Uhde, Germany. 6-24-30.

(235) 1,796,707. Heat exchanger of the type used in the drying, cooking, evaporating or melting of various substances and solutions. O. Engler, Germany. 3-17-31.

(235) 2,037,490. Fast rotating heat exchange apparatus. H. Vorkauf, Germany. 4-14-36.

(235) 2,237,617. Header connection wherein the tubes are arranged within the drum in adjacent vertical rows with each vertical row of tubes connected to a vertically extending collector. H. Trede, Germany. 4-8-41.

(236) 1,781,764. Indirectly heated high pressure generator with heating elements located within the boiler drum. H. Peperkorn, Germany. 11-18-30.

(1) 1,801,811. Cleaner for the flue-gas channels of pre-heaters. E. Haber, Germany. 4-21-31.

(239) 1,802,413. Heating element used in connection with indirectly heated heat exchanger. O. Engler, Germany. 4-28-31.

(239) 1,823,800. Heat transferrer in which the heating elements are arranged inside a drum or other container with connections to the outside thereof. O. Hartmann and M. Hannig, Germany. 9-15-31.

(239) 1,941,268. Boiler having the drum closure seat from the inside against the opening in the drum, much like a manhole closure, and having the rolled joints for the tubes all inside of the drum opening. C. Negendank, Germany. 12-26-33.

(239) 2,239,230. Indirectly heated heat exchange wherein the heating elements are arranged within a drum in such a manner that they can be inserted into the drum and withdrawn from the drum through the manhole of the same. O. Hartmann, Germany. 4-22-41.

(240) 1,808,619. Heat exchanger and particularly interstage superheaters with several groups of heating tubes connected in series. R. Uhde, Germany. 6-2-31.

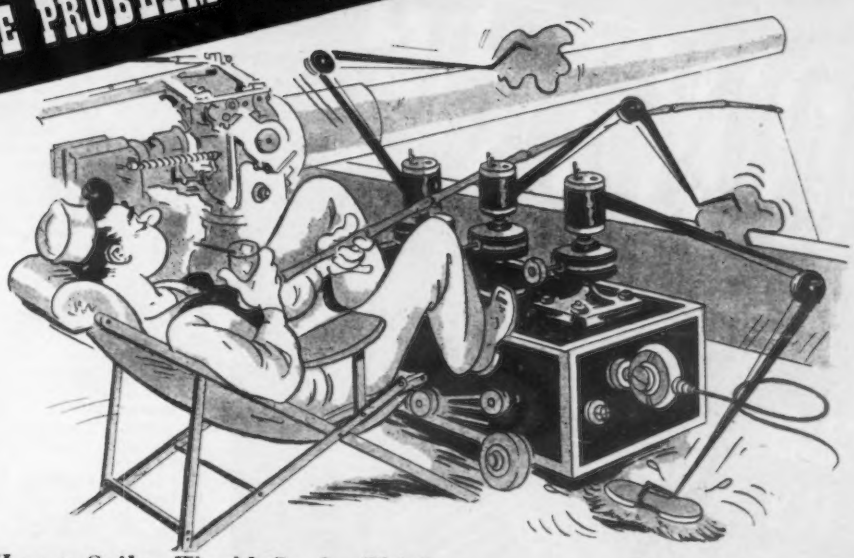
(241) 1,788,742. Apparatus for heating motor-vehicles running on land, flying in the air and floating in the water, and which are driven by an internal combustion engine, the exhaust gases of which are utilized, according to the invention, for producing hot air which is then supplied as heating medium to the compartments and seats of the motor-vehicle. A. Refsgaard, Germany. 1-13-31.

(241) 1,910,565. Apparatus for heating vehicles driven by internal combustion engines in which the exhaust elements of the engine are surrounded by an air heater and the jacket of the air heater is adjustable as regards inner diameter for regulating the temperature of heating air or the quantity of heating air. A. Refsgaard, Germany. 5-23-33.

(241) 1,961,792. Heat exchanger for heating gases. A. Schack, Germany. 6-5-34.

(243) 2,242,432. Heat exchanger which is especially adapted for warming liquids because it is free from narrow tubes or other spaces readily susceptible to obstruction by scale deposits and having walls of sufficient

# WHEN THE PROBLEM CALLS FOR SPECIAL EQUIPMENT



*How a Sailor Would Go for This!*

# MEDART has made it...or Medart can make it!

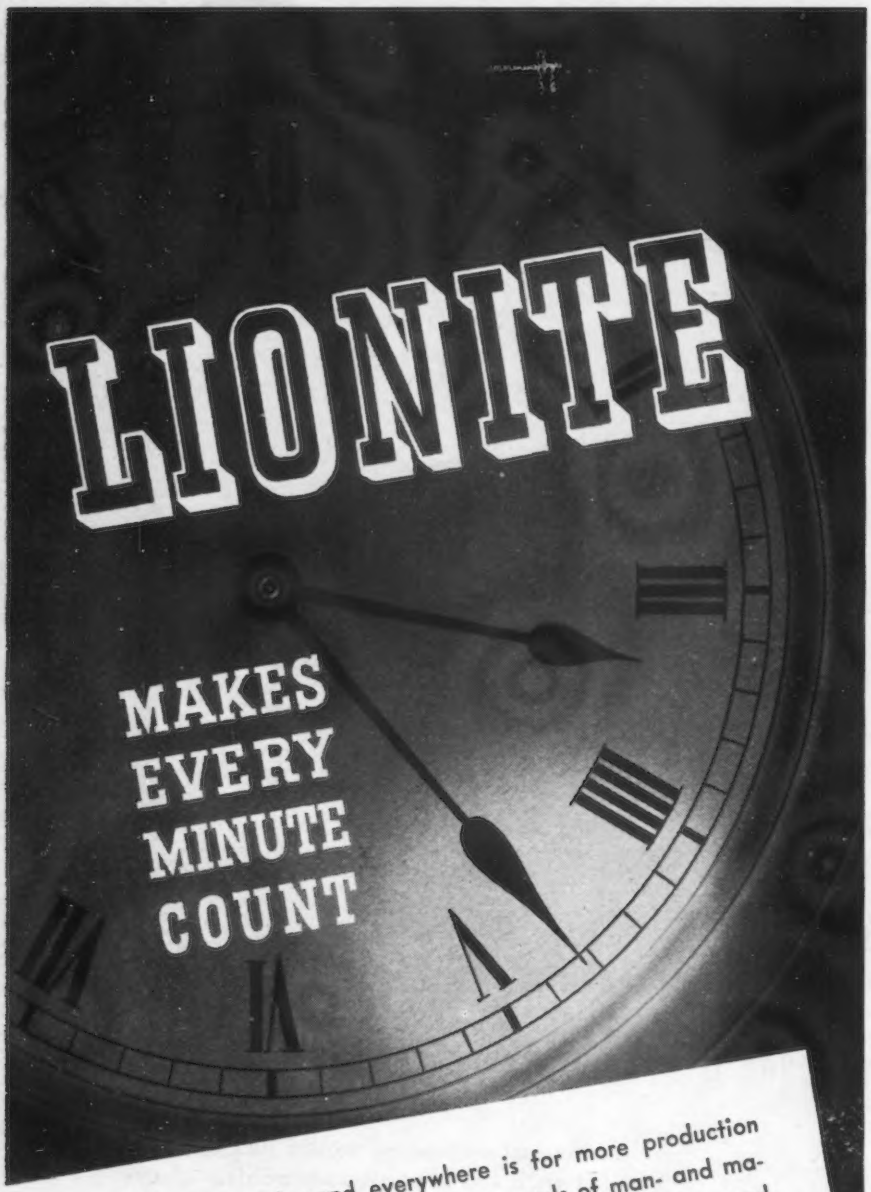
**SOME OF THE SPECIAL MACHINES BY MEDART DURING THE PAST YEAR**

★ *An automatic machine for straightening rifle barrels.*
★ *A mechanism for driving a portable 1000 H. P. Generator with ten 100 H. P. diesel engines.*
★ *A machine for de-rodding metal tubing.*
★ *A billet cold centering machine for tube mills.*
★ *A 400 H. P. Gear reduction unit for a stern wheel towboat.*
★ *Mechanical driving units for agitator tanks.*
★ *Automatic bar feeding table.*
★ *Automatic bar delivery and storage tables.*
★ *Bar cradles.*
★ *Chain wheels*
★ *Furnace car bearings.*
★ *Furnace door frames, etc*

**Much as Medart engineers would like to ease the sailor's lot with the ingenious machine above, Medart concentrates, today, on the problems of American industry... the engineering and manufacturing of complete power transmission equipment and on the manufacture of special equipment for specialized jobs.**

**Over 1,000,000 pattern combinations are in Medart files. The solution to your own special equipment problem is very likely right on hand!... And that special machine you need may be made quicker than you think.**

MEDART




Today, when the demand everywhere is for more production LIONITE Abrasive Grains are saving thousands of man- and machine-hours on polishing operations. New close tolerances and specifications on war equipment have put greater demands on the abrasive manufacturing industry than ever before.

Tough, hard, long-wearing LIONITE grains are carrying an important part of the load. From gun plants to plow works, LIONITE grains are doing their bit by cutting the time on polishing operations and reducing costs. They are sharp, fast-cutting grains and their uniformity is rigidly maintained from lot to lot. Shipment of most sizes can be made promptly, but we suggest that you keep an accurate count of your stock and order your LIONITE abrasives as far ahead as possible. This will help us to plan our production and keep our distributors' stocks in balance.

**GENERAL ABRASIVE COMPANY, INC.**
Lionite and Carbonite Abrasive Grains
NIAGARA FALLS, NEW YORK, U. S. A.



thickness to be resistive against corrosion. F. Lukacs, Germany.

(244) 2,097,851. Air cooler wherein the cooling elements are flat cells with two parallel flat side walls, and the walls have plain outer surfaces without ribs or other outwardly extending projections; baffles are arranged within the elements between their walls for conducting the refrigerant through the elements in a zig-zag path. R. Wenzl, Germany. 11-2-37.

(245) 1,635,838. Heat exchanging element working according to the cross-current principle which consists of any number of cells composed of plates which have angle portions cut out of the corners. E. Haber, Germany. 7-12-27.

(245) 1,669,062. Heat exchange columns or reaction towers for gases, vapors, or liquids. E. Menzel, Germany. 5-8-28.

(245) 1,737,189. Heat exchange device of the type which comprises a group of elements being composed of steel plates in such a manner that passages for a heating fluid and transverse passages for a fluid to be heated are formed, and flanges are provided framing the open sides of the elements. E. Haber, Germany. 11-26-29.

(245) 1,776,162. Heat regenerator particularly but not exclusively for use in connection with internal combustion engine plants. M. Martinka, Hungary. 9-16-30.

(245) 1,863,586. Heat exchanger operated on the counterflow principle. E. Wilke, Germany. 6-21-32.

(245) 1,925,475. Apparatus for the pasteurization of milk. P. Albohr, Germany. 9-5-33.

(245) 1,961,660. Heat exchange apparatus of the plate type for the heating and cooling of liquids such as milk, wort, beer and the like. K. Fehrmann, Germany. 6-5-34.

(246) 1,800,306. Intermediate superheater for high-pressure steam plants. S. Loffler, Germany. 4-14-31.

(247) 1,832,423. Heat exchanger of the type which comprises tubes arranged in concentric relation through which flow fluids at different temperature to effect heat exchange between the fluids. B. Prollius, Germany. 11-17-31.

(248) 1,910,486. Heat exchange apparatus particularly for use as air heater for furnaces. R. Wagner, Germany. 5-23-33.

(250) 1,657,202. Water heater and steam generator comprising, in combination, a thick-walled vertical tube having a helical groove, the sectional area of which is reduced progressively from inlet to outlet, and a shell shoved over said groove. F. Ellyson, Germany. 1-24-28.

(250) 1,969,864. Radiator for cooling oil and particularly lubricating oil for aircraft engines and generally for machines and engines. A. Tebald, Italy. 8-14-34.

(251) 1,679,993. Heat-exchanging structure for air heaters and the like. O. Strack, Germany. 8-7-28.

(255) 1,901,090. Multiple heat exchange coils as used in feed-water heaters and superheaters of steam plants. M. Eule and E. Anders, Germany. 3-14-33.

(256) 1,775,819. Cooling device and more particularly cooling plates which are used in the manufacture of soap, fat, tallow, chocolate and the like. H. Fischer and L. Grodnitzky, Germany. 9-16-30.

(256) 1,873,804. Device for cooling thermionic tubes comprising a block of porcelain or earthenware, a glazed duct in said block, a half of said duct being formed in each of said pieces. H. Zodtner, Germany. 8-23-32.

(256) 2,075,368. Room-heating system of the kind in which the heating elements are concealed within the walls, the floor or the ceiling. G. Squassi, Italy. 3-30-37.

(261) 1,693,520. Cylinder of an internal-combustion engine. R. Kondo, Japan. 11-27-28.

(261) 1,997,502. Air cooled cylinder for internal combustion engines. A. Freiherr von Seld, Jr., and A. Gumprecht, Germany. 4-9-35.

(262) 1,709,745. Integral ribbed economizer tube having a smooth inner surface and comprising straight external disk-like ribs, each being composed of two segments, arranged at right angles to the longitudinal axis of the tube. W. Schroers, Germany. 4-16-29.

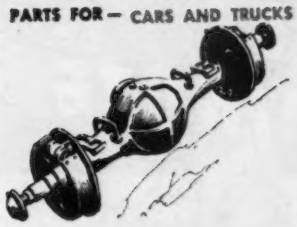
(262) 2,029,450. Heat exchange consisting of tubular elements arranged in groups, which may be used as an air-heater or as a preheater for boiler feed water, for utilizing the heat contained in furnace gases for preheating combustion air or feed water. H. Truelsen, Germany. 2-4-36.

(263) 2,131,929. Heat exchange surface hav-

PARTS FOR — AIRCRAFT

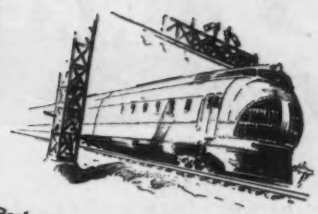
Tail wheel assemblies, actuating cylinders and engine forgings. Brake lining. Camshaft and starter bearings.

PARTS FOR — CARS AND TRUCKS



Automotive, industrial brake lining, axle, gear blank forgings, fan belts, clutch facings. Garage equipment.

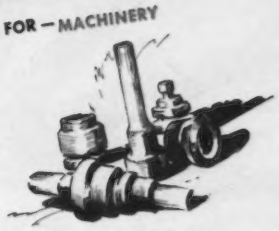
PARTS FOR — TRAINS



Brake Shoes and Meehanite castings. Manganese steel parts. Journal bearings. Freight car wheels.

# Are Parts A Problem? ...consider Brake Shoe as a Source

PARTS FOR — MACHINERY



Meehanite castings, upset and drop forgings, bearings. Manganese steel gears, sheaves. Pressure castings.

***Brake Shoe*** **MAKES PARTS** for original equipment and for maintenance; parts that are upset and drop forged; molded fabrics and plastics; ferrous and non-ferrous castings. In war, as in peace, Brake Shoe ships millions of parts to thousands of manufacturers, in many fields of industry.

Whether your "punished part" problem requires one casting or thousands of steel forgings, Brake Shoe is equipped to help you.

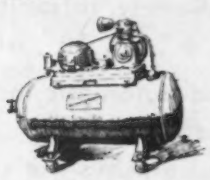
**AMERICAN BRAKE SHOE COMPANY, 230 PARK AVENUE, NEW YORK 17, N.Y.**

AMERICAN **Brake Shoe** COMPANY

**59 PLANTS SERVING INDUSTRY AND TRANSPORTATION**

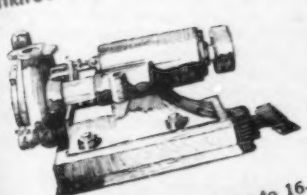
| | |
|---|---|
| American Brakeblok Division | Detroit, Mich. |
| Ramapo Ajax Division | New York, N. Y. |
| American Manganese Steel Division | Chicago Heights, Ill. |
| Brake Shoe and Castings Division | New York, N. Y. |
| Kellogg Division | Rochester, N. Y. |
| American Forge Division | Chicago, Ill. |
| Southern Wheel Division | New York, N. Y. |
| National Bearing Metals Corp. | St. Louis, Mo. |

AIR COMPRESSORS



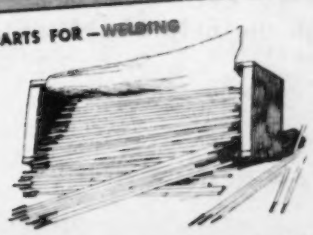
Cushioned air compressors, single stage and two stage, ranging in size from ¼ h.p. to 15 h.p.

CENTRIFUGAL PUMPS



Horizontal and vertical sizes to 16-in. discharge for handling all abrasive and corrosive liquids or materials.

PARTS FOR — WELDING



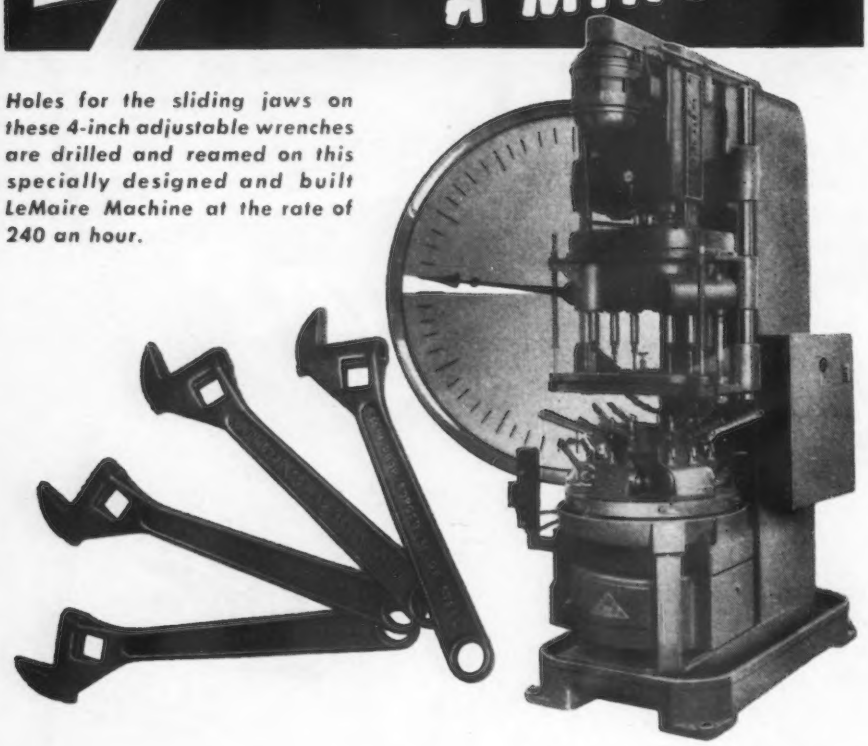
Welding rod, alloy steel for hard surfacing, non-ferrous rod for bearing surfaces. Nickel-manganese filler.

PARTS FOR — EXCAVATING

Placer dredge buckets, power shovel dippers. Quarrying, mining equipment parts. Bronze bearings.

# 4 WRENCHES A MINUTE

*Holes for the sliding jaws on these 4-inch adjustable wrenches are drilled and reamed on this specially designed and built LeMaire Machine at the rate of 240 an hour.*



This machine is composed of a standard LeMaire No. 5000 Twin Ram Hydraulic Power Unit supported by a vertical column mounted on a heavy cast iron base.

The unit has a 10-spindle drilling and reaming head which provides infinitely variable speeds for drilling holes in wrench sizes of 4″, 6″, 8″, 10″, and 12″.

A six-station automatic index table, carrying fixtures for quick loading and unloading, is set for drilling 2 pieces at each of 5 stations and finishes the cycle by reaming at last station with accelerated spindles.

Production ranges from 240 pieces per hour on the 4″ size to 80 pieces per hour on the 12″ size.

This setup illustrates the versatility of the Twin Ram Hydraulic Power Unit and suggests how standard units can be combined to make a highly productive machine—another example demonstrating how an otherwise complicated production problem is transformed into a simple one through the help of LeMaire engineering.

We're ready to help you, too.

**BUY WAR BONDS**

LeMaire TOOL AND MFG. CO.
2661 TELEGRAPH ROAD DEARBORN, MICHIGAN
ENGINEERS AND BUILDERS OF PRODUCTION MACHINES




ing projections arranged transversely to the flow and positioned successively one behind the other in the direction of flow and arranged so that the surface not in contact with the fluid stream is from 0.3 to 4 times the length of the contacting surface. H. Amme, Germany. 10-4-38.

**(263) 2,268,680.** Heat exchanger with wire heat conductors. R. von Linde, Germany. 1-6-42.

**(2) 1,719,138.** Regulating apparatus for steam condensers. E. Roucka, Czechoslovakia. 7-2-29.

**(24) 1,624,066.** Condensing apparatus comprising in combination, a condenser and a jet pump connected to said condenser for removing condensate therefrom, said jet pump being operated by the cooling water passed through said condenser. A. Petersen, Germany. 4-12-27.

**(24) 1,816,592.** Means for collecting atmospheric moisture by condensing the gaseous moisture carried by warm air. A. Knapen, Belgium. 7-28-31.

**(28) 1,611,082.** Apparatus for cooling hydrocarbon gases and vapors at high temperatures. A. Seigle, France. 12-14-26.

**(28) 1,769,743.** Auxiliary condenser for two-stage air ejectors. C. Leblanc, France. 7-1-30.

**(29) 1,746,185.** Combined condenser and separator which is characterized by the fact that it comprises suitable condensing elements which are in communication with the atmosphere of a separator and may consist of vertical tubes whose lower part is connected with the separator. R. Bernat, France. 2-4-30.

**(43) 1,776,349.** Surface condenser comprising a nest of cooling tubes distributed therein to form downwardly converging trenches above the same and downwardly diverging trenches below the same. A. Delas, France. 9-23-30.

**(43) 1,796,510.** Tubular surface condenser comprising a plurality of elementary bundles which lie between upper V-shaped clearances and lower inverted V-shaped clearances, the inner ends of the upper clearances having a finite width, and plates closing the said inner ends. F. Delas, France. 3-17-31.

**(43) 2,047,459.** Surface condenser of the kind wherein the steam is condensed in vacuo upon the outer surfaces of tubes through which circulates liquid, usually water, of a temperature lower than that of the steam. B. Chamayou, France. 7-14-36.

**(55) 1,871,166.** Heat regenerator comprising a container, a series of compartments in said container having perforated walls adapted to contain coarse-grained indifferent material and means for alternately directing into said compartments incoming air and combustion gases. H. Fahrbach, Latvia. 8-9-32.

**(55) 2,048,902.** Apparatus for cooling liquids by evaporating part of the liquid by air, comprising at least one element having walls close enough to each other to be able to retain between them the liquid by capillarity and means for distributing said liquid onto the top of the element. R. Velut, France. 7-28-36.

**(79) 1,891,705.** Apparatus for exchange of heat between two fluids comprising a set of pipes, means for causing one fluid to circulate inside said pipes, means for causing the other fluid to bathe the outside thereof and means for rotating said set of pipes around an axis. F. Delas, France. 12-20-32.

**(85) 2,050,654.** Apparatus for kneading of margarin and other edible fatty substances. A. Gerstenberg, Denmark. 8-11-36.

**(87) 1,839,057.** Heat exchanger comprising a rotary container turning in a liquid which is to receive heat from the contents of said container or to give up heat thereto. A. Singrum, France. 12-29-31.

**(95) 1,790,700.** Spreading roll for the manufacture of plate glass and sheet glass of all kinds produced by rolling and pressing. P. Escole, France. 2-3-31.

**(95) 1,806,490.** Method and device for cooling fatty substances in liquid condition, such as fats, fat emulsions and like substances, by spreading the same in a thin layer or film over a cooling surface. H. Naumann, Netherlands. 5-19-31.

**(95) 1,813,142.** Hollow glass forming roll having means for induction and eduction thereto and therefrom of a cooling medium. L. Boudin, France. 7-7-31.

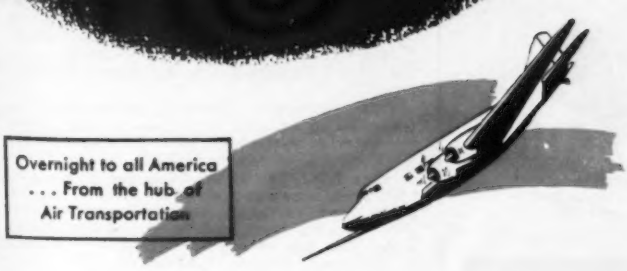
**(95) 1,993,055.** Coating apparatus for regulating the thickness of a layer of a fatty material deposited on a rotary surface. A. Gerstenberg, Denmark. 3-5-35.

**(95) 2,214,874.** Apparatus for controlling

# ILLINOIS TOOL *Inspection*

*The machine illustrated is the Universal Hob and Worm Measuring Machine. Other Illinois Measuring Machines include:*

- Involute Profile Measuring Machine
- Base Pitch and Space Measuring Machine
- Helical Lead Measuring Machine
- Gear Charting Machine
- Universal Cutter and Hob Measuring Machine
- Hob Tooth Profile Measuring Machine
- Hob Lead Measuring Machine



Overnight to all America . . . From the hub of Air Transportation

## WHERE EACH TOOL UNDERGOES STRICT CHECKING ON SPECIALLY DEVELOPED ILLINOIS MEASURING MACHINES!

To assure the exact accuracy of the finished tool, which is fundamental to dependable performance, Illinois Tool engineers developed many types of measuring machines for use as inspection equipment. These machines serve many different checking operations, such as: determining the accuracy of tooth profiles, helical leads and spacing of flutes.

Because of their exceptional accuracy and practicability, these machines are being used also in the inspection departments of leading metal-working plants throughout the nation.

Tools passing inspection on such equipment are certain to be accurate . . . are certain to give you the high quality of performance which careful tool buyers have learned to expect from Illinite Precision Metal-Cutting Tools!

**ILLINITE**

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**HOBS • BROACHES**
**SHAPER CUTTERS • GEAR CUTTERS**
**MILLING CUTTERS • GROUND FORM TOOLS**
**SPECIAL TOOLS**

# ILLINOIS
## TOOL WORKS

*Manufacturers of Metal Cutting Tools and Shakeproof Products*

**2501 N. KEELER AVE., CHICAGO 39, ILLINOIS**

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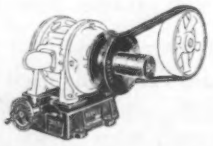
MOTOR *plus*
VARIABLE SPEED *plus*
GEAR REDUCER

ALL IN 1 COMPACT UNIT

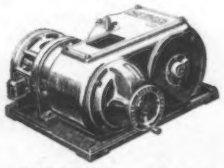
★ This is the REEVES Motodrive. It is a complete, streamlined variable speed power plant consisting of constant speed motor—any standard make—variable speed mechanism, and gear reducer. Installed on any production machine, it provides highly efficient driving power at variable speeds—not just a few step-speeds, but any speed between predetermined limits. This enables an operator to run his machine at *exactly* the best speed for every changing condition; increased production from 25 to 50 per cent is not unusual—in many cases output is doubled . . . The Motodrive is one unit in a complete line built by REEVES. So important are these variable speed units to production processes that they are standardly furnished on 1839 different makes of machines. Thousands more installed *annually* on machines in service. Send for booklet 1-423.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA
*Recognized Leader in the Specialized Field of Speed Control Engineering*

**VARIABLE SPEED TRANSMISSION** for providing infinite, accurate speed flexibility over wide range.



**VARI-SPEED MOTOR PULLEY** converts any standard constant speed motor to a variable speed drive.



**MOTODRIVE** combines motor, speed varying mechanism and reduction gears in single unit.

*Accurate Variable*
REEVES
SPEED CONTROL




the distortion of rolls for use in the manufacture of plate glass. P. Bruno, France. 9-17-40.

**(107) 2,111,010.** Apparatus for cooling or heating and mixing of color mixtures for use in calico printing or other textile processes. Z. Sochor, Czechoslovakia. 3-15-38.

**(125) 1,625,665.** Cooling radiator for aeroplanes and other vehicles and process for its manufacture. A. Lamblin, France. 4-19-27.

**(125) 1,779,898.** Radiator system for airships. L. Breguet, France. 10-28-30.

**(125) 2,095,148.** Radiator composed of removable elements in which the upper and lower water tanks receive, in the known manner, the headers of the various bundles of heat exchanging tubes, arranged parallel to each other. C. Mical, France. 10-5-37.

**(125) 2,124,787.** Radiator for the cooling of aeroplane engines. L. Lachasse, France. 7-26-38.

**(249) 1,920,313.** Heat exchange apparatus such as radiators, evaporators or the like, whose members are constituted by parallel tubes whereon corrugated or puckered fins are threaded. R. Mautsch, Belgium. 8-1-33.

**(139) 1,823,788.** Radiator composed of flat water elements. E. Dewoitine, France. 9-15-31.

**(139) 1,897,113.** Sheet metal radiators for use in central hot-water heating systems. E. Doucet, France. 2-14-33.

**(139) 2,016,007.** Radiator of the kind comprising two plates connected preferably by means of welding along their edges, one plate being provided with hollow ribs for the heating medium. J. Hellen, Norway. 10-1-35.

**(140) 1,714,771.** Sheet metal radiator. A. Fuchs, Czechoslovakia. 5-28-29.

**(140) 1,999,246.** Radiator of sheet metal comprising a plurality of sheet metal vessels, a pair of pressed out necks on each vessel, connecting rings surrounding the pressed out necks of adjacent vessels, grooves in the connecting rings and depressions in the necks and fitting in the grooves. K. Maret, Czechoslovakia. 4-30-35.

**(141) 1,863,555.** Sheet metal radiator comprising four juxtaposed sheet metal plates; the two inner plates are thick and comprise corrugations which form vertical and horizontal passages there-between for the circulation of the heating fluid; the outer plates are thin and comprise flutes which together with the corrugations in the thick plates form vertical passages open at the bottom and top thereof. R. Castiaux, France. 6-21-32.

**(151) 1,828,637.** Base and top member for radiators for central heating plants. R. Bakkekilde, Denmark. 10-20-31.

**(159) 2,261,596.** Means for controlling and improving the admission of heating fluid in heat-exchanging apparatus such as those used in central heating plants. G. Stroobants, Belgium. 11-4-41.

**(172) 1,825,735.** Heating stoves of the kind in which a tubular or other shell traversed by hot gases is surrounded by an outer shell spaced from it. H. Junkers, Germany. 10-6-31.

**(198) 1,962,054.** Device for heating viscous liquid in a tank. S. Cantacuzene, France. 6-5-34.

**(199) 1,735,169.** Apparatus for heating liquids in tanks. J. Kozeluh, Czechoslovakia. 11-12-29.

**(208) 1,632,184.** Cooling arrangement for electrolytic cells. C. Holmboe, Norway. 6-14-27.

**(210) 1,751,712.** Apparatus for melting fatty substances. G. Pellerin, France. 3-25-30.

**(222) 1,770,320.** Apparatus for liquid heating and evaporating. E. Morterud, Norway. 7-8-30.

**(224) 1,926,494.** Heating device for the transmission of heat to liquids passing along the exterior surface of pressure steam tubes. K. Morterud, Norway. 9-12-33.

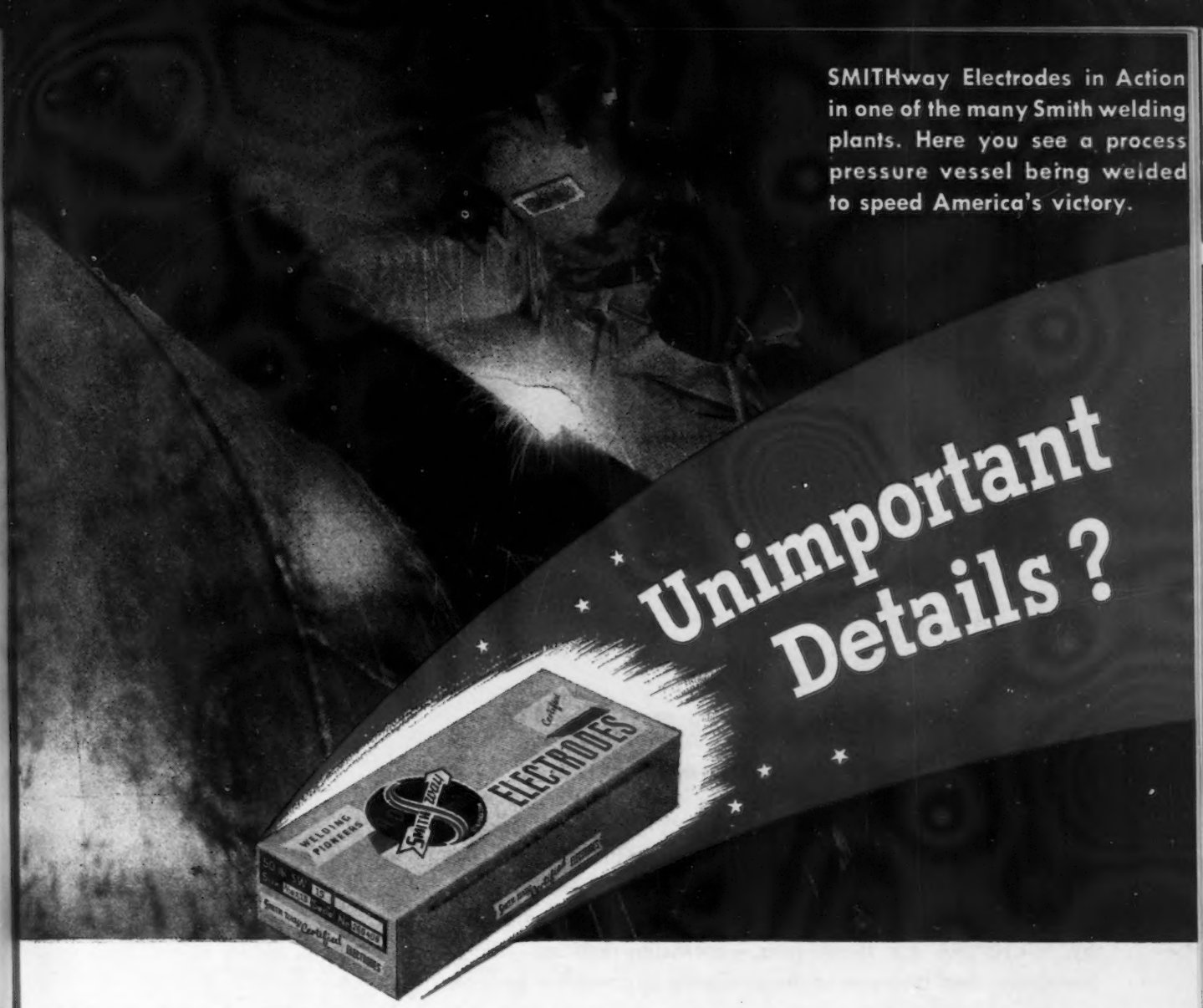
**(230) 1,767,794.** Heat exchanger of the column type, consisting of a plurality of superposed heat exchange units with separating rings between them and transverse circulation tubes for the heating or cooling medium. J. Heizmann, France. 6-24-30.

**(234) 2,236,470.** Device for sterilizing and cooling liquids. L. de Jonge, Netherlands. 3-25-41.

**(241) 1,721,547.** Heating system for all vehicles. C. de la Barre de Nanteuil, France. 7-23-29.

**(241) 1,812,259.** Heat exchange device for use in heating vehicles. C. de Nanteuil, France. 6-30-31.

**(241) 1,867,163.** Method and apparatus for effecting transfer of heat from a heating gas to a gas to be heated through the medium




SMITHway Electrodes in Action in one of the many Smith welding plants. Here you see a process pressure vessel being welded to speed America's victory.

## There ARE NONE in the manufacture of SMITHway Welding Electrodes!

Why can't we slight even the smallest detail in the manufacture of SMITHway Certified Welding Electrodes? Here's why! It is an everyday occurrence for men in our plants to weld vessels that must withstand working pressures up to 5000 psi!

When welding electrodes must shoulder their share of *that* kind of responsibility, only the best are good enough! That is why we make our own.

If all who make welding electrodes used the electrodes they make, as we do, they would know why our rule book says—"There *are no* unimportant details in the manufacture of SMITHway Certified Welding Electrodes."

That is the kind of dependability we offer you in SMITHway Electrodes. And they can give you what they give us—*better welding results* at lower time and material cost. That can be proved in *your* shops.

### Mild Steel . . . High Tensile . . . and Stainless Steel

## WELDING ELECTRODES

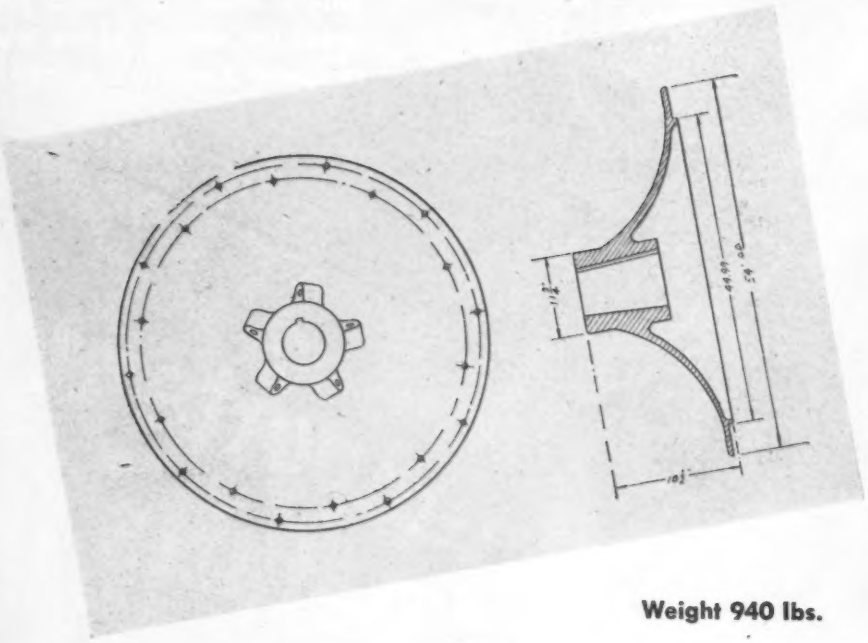
## *made by welders . . . for welders*

***SMITHway Welding Monitor***
*cuts training time as much as 33⅓%.*

***SMITHway AC Welding Machine***
*reduces spatter losses; eliminates arc blow.*

# A.O. SMITH *Corporation*

MILWAUKEE • WISCONSIN • HOUSTON • TEXAS



Weight 940 lbs.

# HUBS OF STAINLESS STEEL

***For the Fans Used in Synthetic Rubber Plants***

• Included in the essential equipment used in the manufacture of synthetic rubber are the large fans built by the American Blower Corporation. Hubs (4 feet in diameter) cast of Stainless Steel Alloy were furnished by MICHIANA for these fans,—corrosion-resistant alloy being required because of the presence of corrosive gases.

So vital to the War effort and all transportation is the production of rubber that great care was exercised in the overall engineering and in the design and quality of all the installed equipment.

MICHIANA Heat- and Corrosion-Resistant Alloy Castings have had the endorsement of experienced production men for many years. MICHIANA experience covers a wide diversity of alloy casting production and application during over a quarter of a century of specialization in this field.

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- Retorts
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- Grids
- Tubes
- Chains

MICHIANA Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS



of heat conducting wall. H. O. Loebell, France. 7-12-32.

(241) **2,198,671.** Heat exchanging device comprising a plurality of superposed pipes forming adjacent pipe rows, each of which is provided with lane rectangular ribs or wings is characterized in that the sides of said ribs or wings parallel with the direction of flow of the heating gases are equal in height to the diameter of the tubes in each vertical row. V. Kulka, Moravia. 4-30-40.

(242) **2,023,646.** Tubular heat exchange apparatus wherein the tubes of a water tube boiler or heater are assembled so that each tube, excepting the end tubes, are in contact or metallic connection with two neighboring tubes along its length. H. Richard, France. 12-10-35.

(243) **1,734,262.** Cooler for compressed air, gas or steam such as used, for instance, for pneumatic postal delivery and other plants in which, in a narrow gap between two telescoped tubes or pipes, a stream of cooling water flows in counter current to a stream of pressure-medium which flows through the central tube. E. Lutschen, Germany. 11-5-29.

(244) **1,906,632.** Heating apparatus for motor boats, motor cars and other vehicles of the kind wherein exhaust gases of an engine are utilized for heating fresh air and for driving a rotary air motor, preferably a small turbine and by means of the latter a fan which serves for circulating the fresh air to be heated. C. Langberg and C. Wathne, Norway. 5-2-33.

(245) **1,648,511.** Air heater consisting in a metal tank or chest which is internally divided by means of sheet-iron plates or partitions into parallel compartments opening outside said tank, alternately, the ones at the bottom and at the top on the left hand side and the others at the top and at the bottom on the right hand side. E. Solomiac, France. 11-8-27.

(245) **1,688,147.** Air heater and the like of fluidtight construction. M. Levron, France. 10-16-28.

(245) **1,705,471.** Heat interchanger of the plate type for the heating of air by combustion gases. G. de Beauvais, France. 3-19-29.

(245) **1,794,573.** Thermic exchanger which allows the caloric or firgorific energy of one fluid to pass over to another fluid in a continuous manner, by means of the interposition of a ceramic, metallic, mixed or other sort of partition. J. Arnoult, France. 3-3-31.

(245) **2,001,849.** Regenerative pasteurization apparatus consisting of heat exchange units formed of a plurality of detachably assembled cone-shaped casings. J. Olsen, Denmark. 5-21-35.

(245) **2,058,022.** Plate heat exchanger for fluids. A. Lebre, France. 10-20-36.

(245) **2,170,484.** Device for tightening the plates of air interchangers consisting of plates assembled by means of sectional irons fitting upon the edges of these plates in such manner as to constitute elements easy to assemble for the circulation of air or gases. E. Prat, France. 8-22-39.

(246) **1,920,122.** Heat interchanging apparatus and process for the exchange of heat between two fluids which are circulated continuously. J. Chavanne, France. 7-25-33.

(246) **2,091,119.** Surface heat exchanger used to transmit heat from one flowing fluid to another flowing fluid, said fluids being either in the liquid or gaseous states. S. Saint-Jacques, France. 8-24-37.

(248) **1,756,808.** Vaporizer for use with boilers and heaters wherein the heat-interchange takes place through the walls of a principal conduit as well as through minor conduits arranged so as to pick up the heating fluid through a funnel. J. Blaudeau, J. Limousin, H. Rousseaux, and A. Dumont, France. 4-29-30.

(248) **1,989,996.** Heat exchange unit comprising a header-box whereof the walls consist of thin sheets of the metal selected for use, said header-box being strengthened by means of a metallic outer jacket or casing which may be continuous and enclose the sheet metal header-box completely, or be formed to enclose any certain portions of the same. R. Mautsch, Belgium. 2-5-35.

(248) **2,049,117.** Heat exchanging apparatus comprising several adjacent rows of superposed finned tubes wherein the fins project perpendicularly from two parallel walls tangential to the tubes, said walls being straight and the fins thereon changing progressively in direction. C. Hubert, France. 7-28-36.

(248) **2,074,452.** Heating element for drying apparatus. A. Bergman, France. 3-23-37.

(248) **2,140,629.** Heat interchange means for

# The machine that knows the ports where sailors' sweethearts are

The Navy never forgets.

Most sailors want part of their pay sent each month to wife or mother. The Navy uses Addressograph* machines to make sure the money goes out promptly — and correctly. The name and address of the one to get the money is handled on Addressograph machines like the ones you use in your office and factory.

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WAYNE JUNCTION, PHILA., PA.




fluids of any nature. C. Hubert, France. 1[illegible] 20-38.

**(249) 2,064,246.** Tube system for heat e[illegible] change of the type wherein, e.g. the heat[illegible] liquid medium inside the tubes is subjected t[illegible] an uninterrupted forced circulation, for i[illegible] stance by means of a pump, while the gaseou[illegible] medium used for heating, flows round th[illegible] tubes. P. Dmitrevskij and D. Astrov, Czecho[illegible] slovakia. 12-15-36.

**(250) 1,962,845.** Apparatus for cooling l[illegible] quids. A. Sideris, France. 6-12-34.

**(251) 1,915,742.** Heat exchange apparatu[illegible] wherein the heat exchange surfaces are con[illegible] stituted by corrugated or puckered fins thread[illegible] ed upon substantially parallel tubes to inter[illegible] connect two or more tubes appertaining t[illegible] one same unit of the apparatus. R. Mautsch[illegible] Belgium. 6-27-33.

**(256) 2,136,992.** Heating structure for dry[illegible] ing, ironing, calendering and similar machines[illegible] J. Heynssens, Belgium. 11-15-38.

**(259) 1,637,276.** Heat-exchanging apparatu[illegible] in which heat is to be transferred to or from[illegible] a gas, such as air, and another fluid, such for[illegible] example, as steam or hot water. J. Potin[illegible] Belgium. 7-26-27.

**(263) 1,782,260.** Removable radiating de[illegible] vice for the cooling of spark plugs. J. Fran[illegible] quet, and N. Dziacos, France. 11-18-30.

**(263) 1,929,365. Heat exchange apparatus** the ends of whose units, of tubular or other[illegible] shape, are joined to headers connected with[illegible] the supply of the fluid flowing through the ap[illegible] paratus. R. Mautsch, Belgium. 10-3-33.

### *Class 16—Miscellaneous Hardware*

**(2) 2,119,625.** Door check of the kind which[illegible] employs the pressure of a fluid to control the[illegible] movement of the door. M. Hasuo, Japan. 6-[illegible] 7-38.

**(2) 2,162,309.** Movable dustproof bush for[illegible] winding keys. H. Junghans, Germany. 6-13-[illegible]

**(33) 2,025,448.** Furniture caster with foot-[illegible] plate. H. Hebbinghaus, Germany. 12-4-35.

**(34) 1,931,446.** Caster for bedsteads wherein[illegible] each caster is connected with the foot in such[illegible] a manner that it can be put in or out of[illegible] action by a simple lever movement. H. Muller[illegible] Germany. 10-17-33.

**(34) 1,999,106.** Travel support devices for[illegible] bedsteads and the like which are arranged at[illegible] the foot of the legs of the bedsteads and the[illegible] like and comprise castor rollers which are[illegible] adapted to be raised and lowered out of or[illegible] into the operative position for traveling. E.[illegible] Muller, Germany. 4-23-35.

**(49) 2,167,409.** Automatic door check with[illegible] tension contrivance and mechanical brake. W.[illegible] Schmidt, Germany. 7-25-39.

**(54) 1,824,217.** Combined door hinge and[illegible] check of the type having a closing spring and[illegible] braking means comprising a fluid container[illegible] associated with one of the leaves of the hinge[illegible] and a piston operatively connected with a pis-[illegible] ton rod to one end of the closing spring. F.[illegible] Kreiner, Germany. 9-22-31.

**(57) 1,941,399.** Hydraulic buffer and closing[illegible] device for doors in which the door and door[illegible] frame are not permanently interconnected by[illegible] links or the like. C. Ischebeck, Germany. 12-[illegible] 26-33.

**(76) 1,810,293.** Device for automatically clos-[illegible] ing doors. A. Reese, Germany. 6-16-31.

**(85) 2,035,844.** Arrangement of door buffers[illegible] on the doors of motor cars. C. Stachow, Ger-[illegible] many. 3-31-36.

**(85) 2,131,339.** Checking device for motor[illegible] car doors. V. Valletta, Italy. 9-27-38.

**(88) 2,173,194.** Sliding door which is sus-[illegible] pended either directly or by means of an ad-[illegible] justing device from the lower arm of an ap-[illegible] proximately U-shaped supporting rail. W.[illegible] Abendroth, Germany. 9-19-39.

**(117) 1,605,671.** Cock handle produced with[illegible] simple means and designed for regulating the[illegible] outflow of cold and hot water. A. Leroi, Ger-[illegible] many. 11-2-26.

**(128) 1,765,493.** Chain cutter for sewing[illegible] machines and more particularly a mechanism[illegible] for imparting a relative movement to the cut-[illegible] ting blades. F. Lutz, Germany. 6-24-30.

**(147) 1,813,145.** Door for bodies of vehicles[illegible] which may be opened by turning it right or[illegible] left at will. G. Cavicchioli and E. Ceschi,[illegible] Italy. 7-7-31.

**(147) 1,896,203.** Combined hinge and latch[illegible] device for doors particularly for aircraft which[illegible] permits the normal opening of the door from[illegible] either side and in an emergency, by the re-[illegible] moval of all the hinge pins from their sockets[illegible] the door can be set free and thrown to the[illegible] outside. C. Rosatelli, Italy. 2-7-33.

**(147) 2,160,330. Door hinging and latching** means especially in connection with refrigerators for the purpose of permitting the open-[illegible] ing of the doors at one side or the other as[illegible] desired according to the lighting and special

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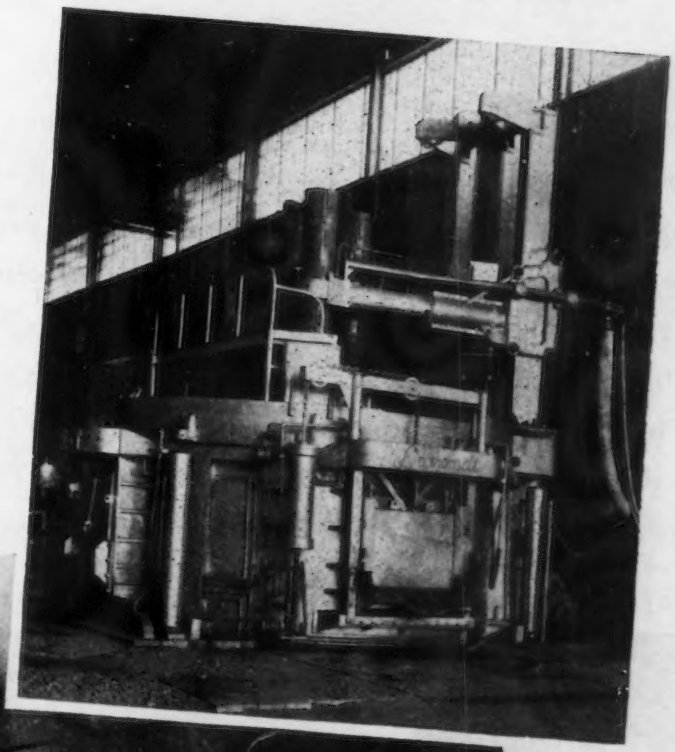

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Whether for tank or tank destroyer, battleship or submarine, aircraft turret or anti-aircraft gun, all Standard steel forgings have one vital thing in common. That one thing is *quality*. Standard products have been known for their dependable high quality during peace and war since the early beginnings of the company 148 years ago.

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characteristics of the environment. C. Hass, R. Witt and W. Quade, Germany. 5-30-39.

**(147) 2,212,114.** Hinge device for a window casement rotatable about two axes. F. Diestelkamp, Germany. 8-20-40.

**(157) 2,201,968.** Hinge connections for doors, boxes and the like and more especially hinges. A. Fischer, Germany. 5-21-40.

**(164) 2,144,977.** Fully concealed hinge for curved vehicle doors. M. Jacob, Germany. 1-24-39.

**(177) 2,205,969.** Hinge connection which lends itself to quantity production of some suitable plastic material, such as artificial resin, by a process of molding under pressure. A. Boenecke, Germany. 6-25-40.

**(179) 1,707,027.** Expansible hinge for trunk cases adapted by telescopic action to afford variable accommodation or capacity for the contents. H. Schwarzenberger and W. Schmidt, Germany. 3-26-29.

**(194) 1,771,222.** Window of the kind comprising double-hung sashes whereby a plurality of sashes can readily slide up and down either individually or jointly. K. Kato, Japan. 7-22-30.

**(194) 1,773,059.** Window or door of the type provided with a counter balance and vertically sliding in the frame whereby both sides of the door are automatically kept parallel to the grooves of the frames irrespective of the point of application of force. T. Ohno, Japan. 8-12-30.

**(197) 1,745,578.** Balancing device for the sashes of windows and other like closures or movable objects. E. Kreissig, Germany. 2-4-30.

**(198) 2,010,214.** Compensating device for sash windows and the like wherein the cord, when the sash is raised, will be wound upon one or more spring controlled rollers or drums. K. Braun, Germany. 8-6-35.

**(84) 2,018,564.** Hinge with hydraulic brake. L. Milly, France. 10-22-35.

**(86) 1,832,505.** Device for the elastic fastening of a door to its frame comprising a lug and a socket member which are adapted to be mounted together respectively, for instance one of them on the door and the other on the door frame of an automobile body. H. Rocheron, France. 11-17-31.

**(116) 1,831,752.** Manufacture of hand-grips comprising a lining formed by a mass molded directly around a central framework. L. Reinold, France. 11-10-31.

**(116) 1,860,596.** Molded grip or handle for saucepans or other vessels. L. Reinold, France. 5-31-32.

**(121) 2,080,656.** Means for attaching knobs, handles or other objects to a wall, door or the like. A. de Vries, Netherlands. 5-18-37.

**(125) 1,653,949.** Portable battery of electric accumulators. A. Dinin, France. 12-27-27.

**(128) 1,612,656.** Hinge attachment comprising two hinge plates, and lugs or projections at the ends of the said plates, an axis secured to one of the said plates and traversing the lugs of the second plate and an elastic sleeve interposed between the said axis and the lug of the hinge plate which is traversed by the said axis. R. Salin, France. 12-28-26.

**(128) 1,898,161.** Hinge device of the type having two hinges, one of which is mounted on the upper frame member of the door, the other on the lower frame member, each pivot pin of the hinges engaging an aperture provided in a metallic flap fixed respectively in the upper and lower lintels of the door case. J. Arnold, Belgium. 2-21-33.

**(128) 1,954,934.** Elastic hinge joint comprising leaves having axially alined abutting sockets closed at their outer ends. M. Houdaille and C. Lecler, France. 4-17-34.

**(132) 1,803,438.** Hinge particularly adapted to be used on automobiles and similar vehicles provided with means for automatically taking up wear in a hinge assembly. H. Rocheron, France. 5-5-31.

**(139) 1,913,899.** Bolt hinge which is applicable in any case required to connect two elements having relative angular movements. C. Rodanet, France. 6-13-33.

**(161) 1,677,441.** Automatic lubricating device for hinges of doors and windows. I. Gonyk, Yugoslavia. 7-17-28.

**(163) 1,844,978.** Closing mechanism for railroad car doors adapted to make the closing of the door a two-phase operation. L. Renaud, France. 2-16-32.

**(166) 2,143,704.** Pivot door plate in which a pair of hinge sections are operatively connected by means of a pair of pins projecting from one hinge section and received by slots in the other hinge section. F. Kufnerl Czechoslovakia. 1-10-39.

**(200) 1,639,094.** Counterbalancing means for movable devices under the control of resilient systems. G. Klein, France. 8-16-27.

***This Feature Will be Continued in an Early Issue***

# 21 Ways that Jones & Lamson Optical Comparators help your

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1. Electrical equipment
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4. Type faces
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6. Button dies (plastic)
7. Matches

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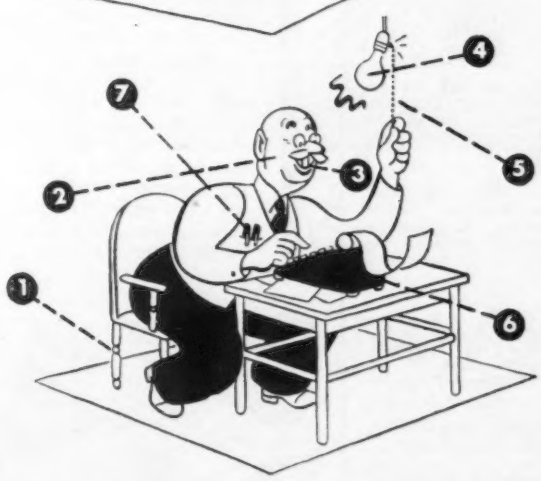
2. Textile machinery
3. Hair clippers
4. Eye glasses
5. Typewriters
6. Bottle molds and closures
7. Pen points



## 'RITHMETIC

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2. Electric shavers
3. Tooth brushes
4. Light bulbs
5. Light chains
6. Adding machines
7. Automatic pens and pencils

During the past 22 years, **Jones & Lamson Optical Comparators** have been used for inspecting thousands of interesting and peculiar jobs. Readin', 'ritin', and 'rithmetic have been definitely helped, just as have the food you eat—the clothes you wear—the room you're in—the war you're fighting. Whatever product you manufacture, be it mechanical, electrical—*anything*—call in a Jones & Lamson expert to show you how you can inspect it more accurately, faster, at less cost, through the use of **Jones & Lamson Optical Comparators.**

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**plus POWERFUL WASHES**

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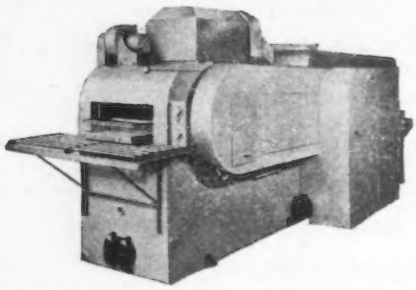

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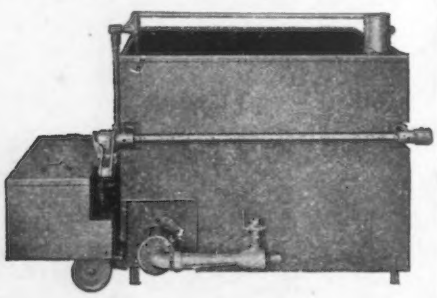
A unit for positive, production line cleaning of metal parts, etc. Hot SOAKING PROCESS combined with powerful washing section. Equipped with a built-in Drying Unit and Chamber. Parts delivered properly cleaned and dried.



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A small, compact, mechanically simple unit combining ACTIVE-SOAK with WASHING ACTION. Removes oil, grease, chips from metal parts, assemblies, castings, etc. Can be installed individually in different departments or in a series for consecutive steps of cleaning, rinsing, coating or treating.

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## *Among This Week's Trade Notes*

**International Harvester Co.**, Chicago, will construct an addition to its Fort Wayne, Ind., heavy motor truck plant. The project will cost over $1,000,000, and will be used for parts packaging, outfitting and warehousing.

•

**Williamson Heater Co.**, Cincinnati, announced the purchase of the steel furnace business of the Michigan Tank & Furnace Co., Detroit.

•

**Ott Machinery Sales Co.** on Dec. 14 will sell at auction equipment held in its warehouse at Second and Congress Streets, Detroit. Following this sale, Ott will continue operations on a reduced scale, necessitated by many employees joining the services. After the war Ott plans to resume business on the full pre-war scale.

•

**Herbert Ziegler** has resigned from the administrative staff of the Pacific Tube Co., Los Angeles, and has established himself as a steel sales representative with headquarters at 684 S. Gramercy Place, Los Angeles 5. At the start he will represent the following: Lapham-Hickey Co.; Wilson Steel & Wire Co.; Bernard Epps & Co.; and West Virginia Rail Co.

•

**Welker Machinery Co., Inc.**, Detroit, has been appointed special distributor for TOCCO process induction equipment by the Ohio Crankshaft Co., Cleveland.

•

**Yost Superior Co.** and **Airetool Mfg. Co.** have purchased the Shuey Factories Building in Springfield, Ohio.

•

**Turco Products, Inc.**, has opened an organic research laboratory in its Los Angeles laboratory. Dr. Nathaniel Baum has been appointed head of the new department.

•

**Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has formed a separate marine industry department. Charles H. Weaver, former manager of the marine section of the industrial department, has been appointed head of the new section.

•

**Colonial Broach Co.**, Detroit, has opened a branch office at 1506 Toledo Trust Building, Toledo, Ohio. Morris Teague and W. F. Haverstock are in charge of the new branch office.

## *Valley Steel Firms Fight Rail Rates*

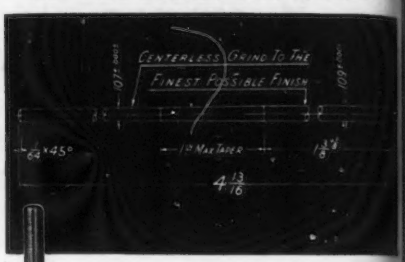
(CONTINUED FROM PAGE 103)

1935, the 10c. emergency charge was eliminated and the 12c. lifting charge was reduced to 5c. per ton as a result of threatened motor truck competition. On Nov. 15, 1937, an additional ½c. per ton was added to the lifting charge. On March 18, 1942, because of Ex Parte 148 increases, the rate became 93c. and the lifting charge 6c. per ton. These increases were removed May 15, 1943, and the rate is now 90c. per ton with a 5.5c. per ton lifting charge.

Ex-river coal from the Ohio River is delivered by barge to the Pennsylvania Railroad transfer facilities


## PRECISION PARTS

## AS THOUSANDTHS SHEER

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Ace, with modern heat-treating and centerless grinding methods, is turning them out by the thousands. Meeting these war-time demands for unbelievable accuracy, on a mass-production basis, has developed Ace ingenuity. Ace can therefore offer manufacturers many advantages in the profitable post-war markets. Here under one roof is a source of supply for small parts or assemblies which call for stamping, machining, heat-treating, or grinding. If you are thinking in terms of present production, we have capacity available from time to time. If you are planning for the future, let's talk it over now.

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Engineers who design construction equipment can take pride in the construction industry's greatest achievement... its part in building America's "Arsenal of Democracy."

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Familiar to them, as a means of giving longer life to construction equipment, is the widespread use of Nickel Alloys. Those engineers have learned from long experience that Nickel imparts toughness, strength, and corrosion resistance to ferrous and non-ferrous metals, and thus assures improved performance under the most severe conditions.

Among them, as with men in many other industries, the saying is that "a little Nickel goes a long way" toward increasing dependability of machine parts—from gears to scraper blades, from dipper teeth to crusher rolls.

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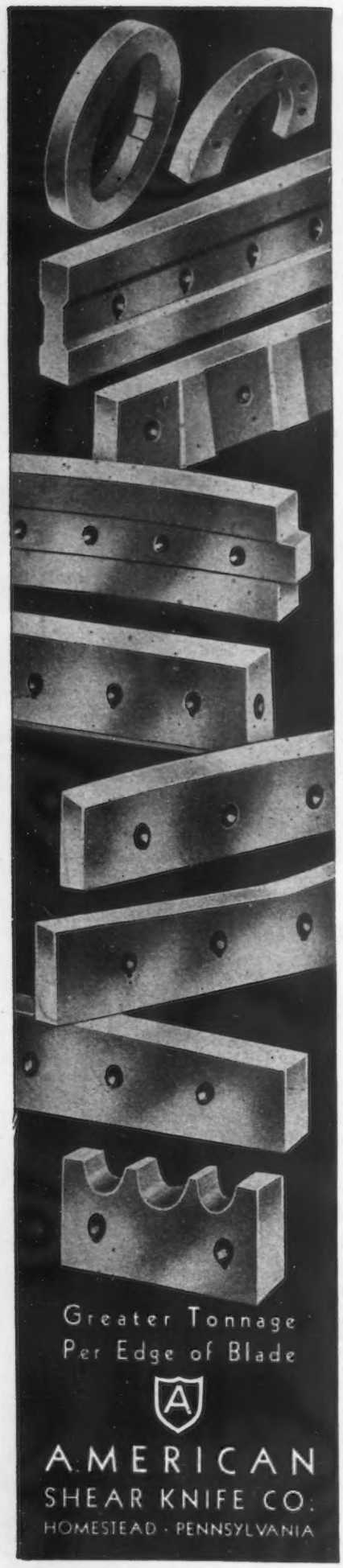




at Conway and the Pittsburgh & Lake Erie facilities at Colona, Pa. It is transferred from the barges to railroad cars which are weighed immediately below the loading tipple and assembled into trains. Coal movement from these points into Youngstown is currently about 140,000 tons per month.

**There have been** past efforts on the part of coal users, spearheaded by the steel producers, in the Youngstown area to get a reduction of the ex-river coal rate to something at least close to the original rate offered by the Pittsburgh, Lisbon & Western Railroad, namely, 60c. per ton. The railroads, while expressing sympathy with the situation, have consistently refused to make any effort to reduce the rate. The reasons offered are that revisions would not fit in with the all-rail rates; and reduced ex-river coal rates could not be made without adversely affecting coal rates in other areas.

In protesting the ex-river rates, comparisons of train-mile earnings on Youngstown Sheet & Tube Co. shipments with train-mile earnings on all-revenue-freight and all-coal shipments of the Pittsburgh & Lake Erie railroad were offered. Revenue on ex-river coal shipments per train-mile were almost double those of all-revenue-freight and all-coal freight handled.

The protests to the high ex-river rail rate on coal by Youngstown Sheet & Tube Co., are largely predicated on rate comparisons for similar coal hauls in other areas and on rate comparisons for other commodities hauled. In addition, railroad operating expenses on all-revenue-freight were reduced to cost per ton-mile of handling Youngstown Sheet & Tube Co.'s ex-river coal, based on an average of all-revenue-freight costs, as shown in Table I.

**Earning comparisons** on various commodities hauled by the Pittsburgh & Lake Erie Railroad are shown in Table II. (See page 103.) Ex-river coal yielded a greater revenue per carload and a greater average revenue per car-mile than any other commodity hauled. Curiously, "iron and steel products" and "miscellaneous and manufactures" (likely the bulk of which consisted of products of the metal working industry) yielded the second and third greatest revenue per carload and per car-mile. In 1942, ex-river coal traffic yielded $1.537 per car-mile, which was more than double the yield on all-revenue-freight, which yielded 70c. per car-mile. The revenue

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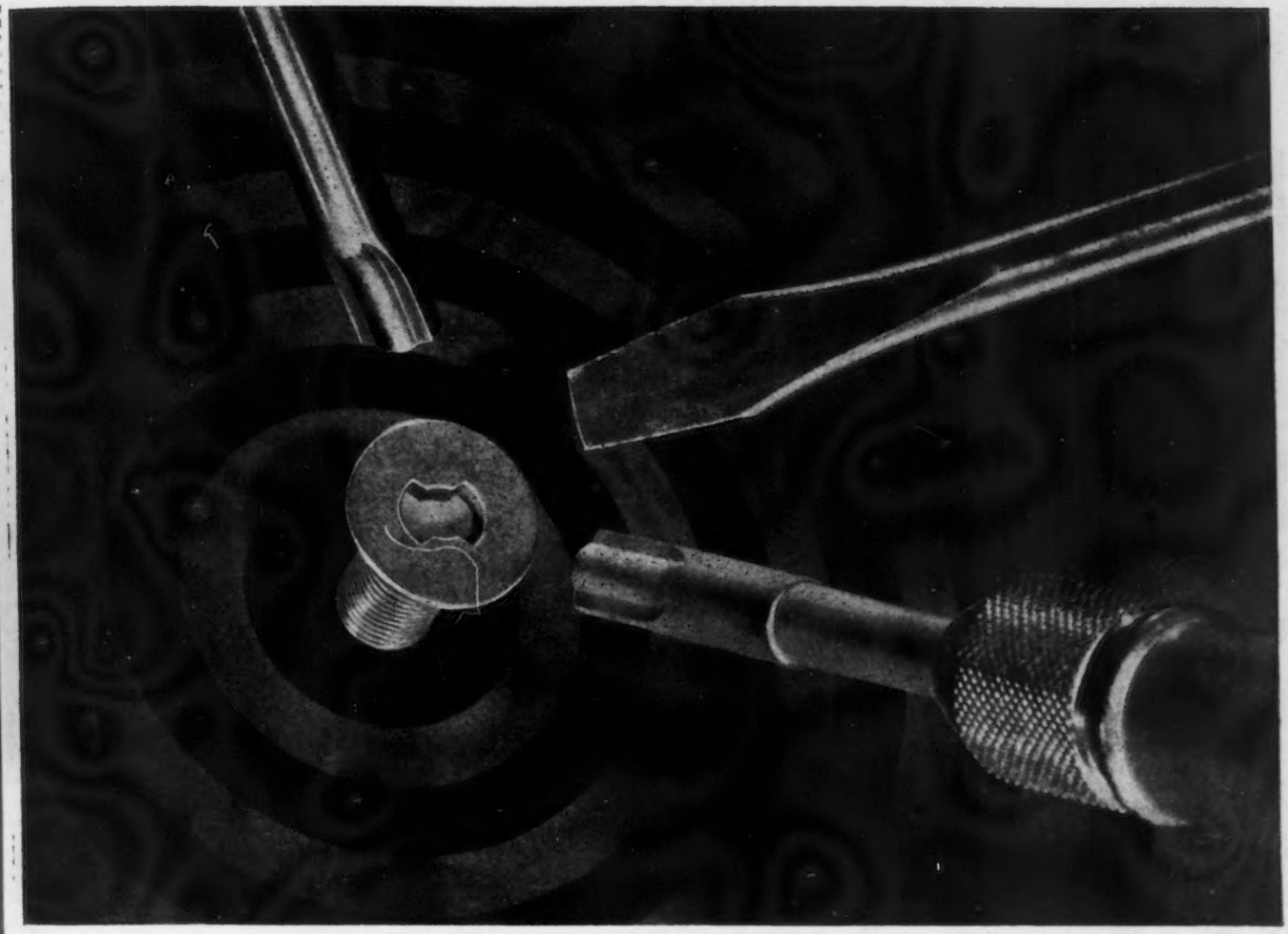

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CLUTCH HEAD Screws provide that kind of bull's-eye. Note the width, the depth, the roominess of the Clutch recess . . . an easy target even for the untrained eye and the unskilled hand. Note also the straight walls of the Clutch, matched by the straight sides of the driver, making *bit entry automatically true and complete* for a torque drive home that is almost effortless. Note the Center Pivot section of the Assembler's Bit which prevents canting . . . vitally important at all times. By preventing side-slippage, CLUTCH HEAD Screws also safeguard manpower and materials.

May we send you fully illustrated Brochure along with an assortment of CLUTCH HEAD Screws and sample Center Pivot Assembler's Bit . . . so that you may personally *check the many exclusive features for safety, speed, and economy* which establish CLUTCH HEAD as the most modern screw on the market today.

*Screwdriver Control,* being operative with ordinary type screwdrivers, is proving itself to be an important CLUTCH HEAD feature in wartime field service. This applies to all CLUTCH HEAD Screws . . . Standard and Thread-forming types for every purpose.

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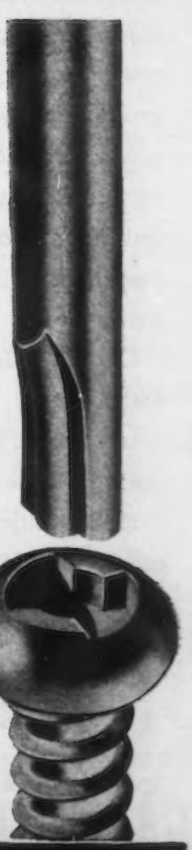
This Center Pivot Assembler's Bit delivers *longer* uninterrupted service. Requires no "back-to-the-factory" shipment for reconditioning. A brief application of the end surface to a grinding wheel restores original efficiency.



**UNITED SCREW AND BOLT CORPORATION**

CHICAGO CLEVELAND NEW YORK

per car-mile on the other commodities shown ranged from 55.5c. to 69.9c.

In attempting to establish with the Interstate Commerce Commission the fact that Youngstown ex-river rates on coal are too high, the data shown in Table III (see page 140) were offered. The interesting part of this data are the figures shown in Col. 10. These figures show what the Youngstown ex-river coal rate would be if established on the same ton-mile basis as those shown for each of the other listings, and would in every case be lower. For example, if based on rail rates for iron ore from lower lake ports to Youngstown, ex-river coal rates would be 47c. per ton; on ex-river rail rates from Cincinnati to Middletown, Ohio, the rate would be 67c. per ton; and so on. Here, it is clearly established that Youngstown ex-river rates are considerably higher than comparable rates in other areas.

Likewise, these data clearly indicate that railroad earnings on eastern Ohio ex-river coal are out of line with those on other commodity hauls and other ex-river hauls. Col. 5 shows that railroad ton-mile earnings are higher on the Youngstown coal than on any other haul described. Similarly, Cols. 6, 7 and 8 show that revenue per car-mile and per train-mile based on 50 and 100 car trains is considerably out of line for ex-river coal into Youngstown.

**Another important** factor brought out in the hearing was that return loads are easily acquired after the coal is delivered in Youngstown. Limestone from the Hillsville, Ohio, district, near Youngstown, is shipped via Pittsburgh & Lake Erie into Aliquippa and from the same district via Pennsylvania Railroad to Midland, Pa. Hopper car requirements in 1941 for limestone loading by three commercial producers were in excess of 27,000 cars, all of which were furnished from and in the Youngstown district railroad yards. In addition, the Pittsburgh Limestone Corp., owned by the U. S. Steel Corp., together with the Standard Slag Co., both close to Youngstown, used about 39,000 hopper cars in 1941 in outbound shipments.

During the winter months when the lake shipping season is closed, the Pittsburgh & Lake Erie Railroad, in conjunction with the New York Central or the Pennsylvania, handles a trainload of iron ore daily from Ashtabula to the Northside Works of the Jones & Laughlin Steel Corp., Pittsburgh. This daily ore movement, necessary because of the limited ore storage space at Jones & Laughlin,

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*Photo—An army Bulldozer pushes a truck through heavy mud as U. S. Forces advanced on Rendova Island in the Central Solomons.*

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Pressed Metal Parts and stampings will be used by the railroads, and by numerous other industries of the country because of their low cost, their broad range physical characteristics, their aid in the creation of beauty, and for their other well known qualities that has called for the tonnage in the past.

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ARMY E NAVY

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*Subsidiary of* SPICER MFG. CORP.

***Western Representative F. Somers Peterson, 57 California St., San Francisco, Cal.***

**TABLE III—Comparison of Ex-River Coal Rate of Youngstown Sheet & Tube Co., from Colona and Conway, Pa., to Youngstown, Ohio, with Rates on the Same Movement, Based on Revenue Per Ton-Mile for Similar Traffic**
**(Based on Average Carload Weight of 67.8 Net Tons except on Iron Ore)**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mileage | Carload Weight, Net Tons | Rate Per Ton, Dollars | Revenue Per Car, Dollars | Revenue Per Ton-Mile, Mills | Revenue Per Car-Mile, Dollars | Revenue Per Train-Mile Based on 50 Car Train, Dollars | Revenue Per Train-Mile Based on 100 Car Train, Dollars | Revenue Per Car Based on Colona-Conway Mileage, Dollars | Resultant Rate per Net Ton, Based on Colona-Conway Mileage |
| (A) Ex-River Coal of Youngstown Sheet & Tube Co. from Colona-Conway, Pa., to Youngstown, Ohio | 42.25 | 67.8 | 0.90 | 61.02 | 21.30 | 1.444 | 72.20 | 144.40 | 61.02 | 0.90 |
| (A) Ex-Lake Iron Ore of Youngstown Sheet & Tube Co. from Lower Lake Erie Ports to Youngstown, Ohio | 71.4 | 71.77 | 0.7857 (C) 0.88 G.T. | 56.39 | 11.00 | 0.790 | 39.50 | 79.00 | 33.38 | 0.47 |
| Lake Cargo Coal from Pittsburgh District to Lower Lake Ports for Trans-Shipment via Vessel | 181.0 | (1) 67.8 | 1.56 | 105.77 | 8.57 | 0.581 | 29.05 | 58.10 | 24.55 | 0.36 |
| Coal from Jerome Mine, Pa., to Glenwood for Trans-Shipment via Barge | 131.4 | (1) 67.8 | 1.25 (B) | 84.75 | 9.51 | 0.645 | 32.25 | 64.50 | 27.25 | 0.40 |
| Coal from Eureka Colliery No. 30, Pa., to Jacks Run Dock, Pittsburgh, for Trans-Shipment via Barge | 109.0 | (1) 67.8 | 1.25 (B) | 84.75 | 11.47 | 0.778 | 38.90 | 77.80 | 32.87 | 0.48 |
| Ex-River Coal from Cincinnati to Middletown, Ohio | 44.4 | (1) 67.8 | 0.70 | 47.46 | 15.77 | 1.069 | 53.45 | 106.90 | 45.17 | 0.67 |
| Coal from Logan District, W. Va., to Huntington, W. Va., for Trans-Shipment via Barge | 87.8 | (1) 67.8 | 0.55 (C) | 37.29 | 6.57 | 0.446 | 22.30 | 44.60 | 18.84 | 0.28 |

*** Resultant rates shown in Col. 10 are what the ex-river rate to Youngstown would be if it were established on the same ton-mile earning basis as the various rates shown. Col. 10 is Col. 5 times 42.25, the ex-river mileage haul.**

**(A) Earnings of Youngstown Sheet & Tube Co. ex-river coal and iron ore are actual figures taken from company files.**

**(B) Rate applies F.O.B. barge and includes dumping charge.**

**(C) Rates were not subject to Ex Parte 148 increase of 3c. per ton.**

**(1) Weight shown is average carload weight of Youngstown Sheet & Tube Co. ex-river coal from Colona and Conway, Pa. Actual average carload weights of bituminous coal originated on the lines hauling from these points were: B & O RR.—55.1 net tons, C & O RR.—58.4 net tons, Pennsylvania RR.—56.0 net tons.**

requires a constant supply of empty cars which are made available from Youngstown by a short empty haul from Youngstown to Ashtabula, Ohio.

Taking into consideration the high average carloading, the uniform movement, the availability of return hauls, the fact that railroad operating officials have absolute control over the whole ex-river coal movement, the ideal transportation conditions, and the high ex-river coal rate of 90c. per ton on rail shipments from Colona and Conway, Pa., into Youngstown, Ohio, Mr. Fowler stated that ex-river coal business must be about "the sweetest piece of year-round transportation that either road (the Pennsylvania or Pittsburgh & Lake Erie) handles."


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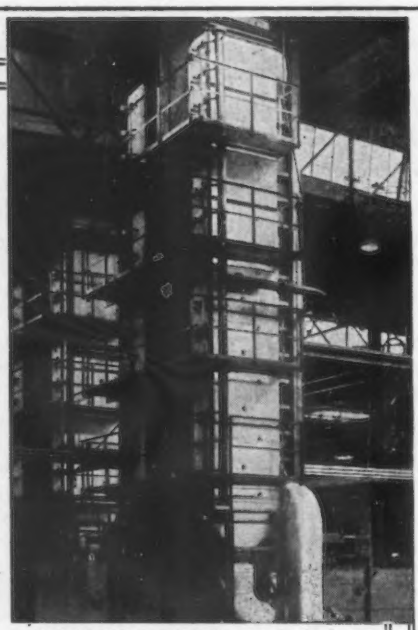

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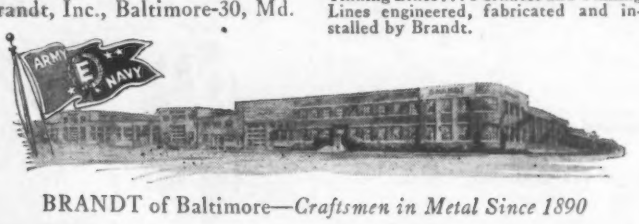


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# LINES BEHIND THE LINES

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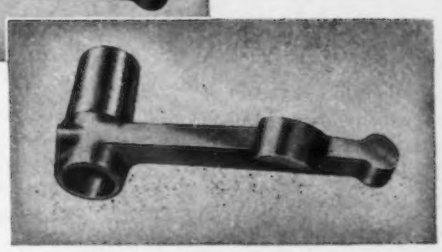
Keeping pace with the Kaisers and other miracle workers in the shipyards, the small boat builders are placing the emphasis decidedly on speed. Yet the highly efficient machinery in the boats they are building also puts a premium on accurate parts fitting. To secure this production-with-precision the boating industry relies heavily on broaching. Broaching—a better way to do many metal working jobs — is the only *right* way to do some!



Using an American Type T Three-Way Broaching Machine, top and bottom faces are finished on the rocker arm shown in before and after views above. Many marine products — including parts for motors, transmissions, armament, and electrical systems—are broached economically with American equipment. American's *complete* broaching service — machines, tools, and engineering — makes war production more efficient, post-war production more profitable.

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DIVISION OF SUNSTRAND MACHINE TOOL CO.

# PERSONALS

• **Robert T. Dunlap** has been made assistant to the president of Wickwire Spencer Steel Co. Prior to joining Wickwire Spencer Mr. Dunlap was general works manager of the Vulcan Iron Works at Wilkes-Barre, Pa.

• **J. Copeland Gray**, director of industrial relations for the Buffalo Arms Corp., has been appointed a member of Regional War Labor Board, District 2.

• **Eugene B. Steele**, former production executive for the WPB in Washington and Syracuse, has been appointed manager of production engineering for the Bell Aircraft Corp., Buffalo.

• **A. L. Monteith**, former assistant personnel director at Rheem Mfg. Co.'s Birmingham plant, has been promoted to personnel director.

• **J. F. Bechtle** has joined the Standard Steel Corp., Los Angeles, as assistant general manager. He was connected with the metallurgical and research department of M. W. Kellogg Co., New York for 20 years.

• **D. J. Hutchins** has been appointed manager of the manufacturers sales division of the Firestone Tire & Rubber Co., Detroit. Mr. Hutchins, who resigned recently as Detroit regional director for WPB, succeeds **H. M. Taylor**, who was promoted and transferred to Akron as manager of the manufacturers sales division.

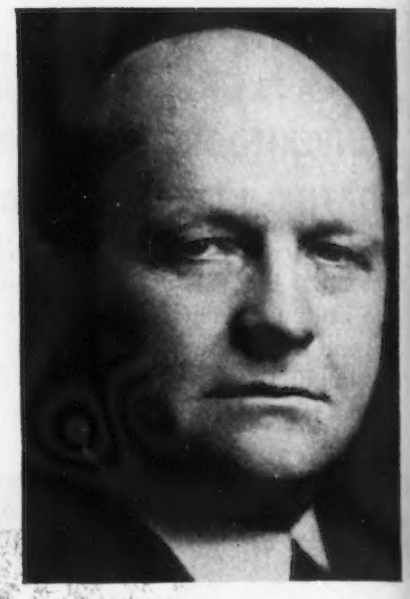
• **B. E. Starr** has been named manager of Pontiac Motor Co.'s aircraft torpedo plant, and **Clarence Mahar** has been named production superintendent.

• **J. H. Hamilton** has been appointed sales representative for Gould Storage Battery Corp., Depew, N. Y., in the San Francisco territory. He will have his offices at 478-421 Flood Building, San Francisco.

• **Willard T. Jones**, secretary and formerly purchasing agent, has been appointed sales and production manager of the Steel Castings Div. of Adirondack Foundries & Steel, Inc., Watervliet, N. Y.

• **J. C. Lewis** has been appointed field representative in the states of Arkansas, Louisiana, Texas and Oklahoma for Drayer & Hanson, Inc., Los Angeles.

ROBERT T. DUNLAP, assistant to the president, Wickwire Spencer Steel Co., New York.



WILLIAM L. STANCLIFFE, vice-president in charge of sales, American Car & Foundry Co., New York.

• **Roy A. Garrison**, works manager in charge of shop operations for both the steel foundry and forgings divisions of Adirondack Foundries & Steel, Inc., Watervliet, N. Y., has been elected a vice-president of the company.

• **Ruth Leach** was recently elected a vice-president of International Business Machine Corp. She was previously manager of systems service for the entire company. **Mary Schultz** was made assistant vice-president. Miss Schultz was previously assistant manager of systems service.

• **Joseph L. Dudley**, formerly associated with the Stone & Webster Engineering Corp., has joined the staff of the Cochrane Steam Specialty Co., Boston.

• **J. W. Gwynne** was made engineer in charge of defense engineering staff and government contracts for Carnegie-Illinois Steel Corp., Pittsburgh. **L. B. Patin** was appointed construction engineer in charge of DPC contracts. **P. A. Granklin** was appointed assistant construction engineer for the company.

• **T. W. Macdonald**, director of public relations, Republic Aviation Corp., Farmingdale, N. Y., has resigned to join American Airlines, Inc.

• **A. G. Fournier** has been appointed sales and service engineer in the states of California, Arizona, and Nevada for Pioneer Pump & Mfg. Co., Detroit. His office will be at 2444 East 24th Street, Los Angeles.

• **William L. Stancliffe** has been appointed vice-president in charge of sales of American Car & Foundry Co., New York. He succeeds the late William E. Hedgcock. When American Car & Foundry Motors Co. was formed in 1926, Mr. Stancliffe became its vice-president in charge of motor coach sales. In February, 1932, he transferred to the operating department of American Car and Foundry Co. and later became a vice-president of that company in charge of miscellaneous sales and munitions.

• **John C. Graf** has been appointed sales manager of hydraulic press and special equipment department of Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia. From 1925 to his present appointment he served as the New England sales manager.

• **James A. Ogilvie** has been appointed general superintendent of Atlantic Seaboard Division of the Pittsburgh Metallurgical Co., at Charleston, S. C.

• **A. A. Borgading, E. D. Campbell, J. A. V. Scheckenback**, and **R. A. Williams** were recently elected vice-presidents of the American Car & Foundry Co., N. Y.

• **Wm. C. Judy**, 302 Sugar Building, Denver, has been appointed district sales manager for Bliss & Laughlin, Inc., Harvey, Ill., and Buffalo. Mr. Judy has been in Denver as a mill representative since 1925.

**F. C. BIGGERT, JR., recently elected a director and member of the executive board, Follansbee Steel Corp., Pittsburgh.**

• **F. C. Biggert, Jr.,** chairman of the board of the United Engineering & Foundry Co., Pittsburgh, has been elected a director and a member of the executive committee of the Follansbee Steel Corp. to fill the vacancy caused by the recent death of George T. Ladd.

• **Jerome A. Raterman,** vice-president and treasurer, was elected executive vice-president and treasurer, and **Martin J. Luther,** Chicago branch manager since 1930, was made general sales manager, Monarch Machine Tool Co., Sidney, Ohio. **Kermit Kuch,** Newark, N. J., branch manager, was appointed chief engineer and will now be located at Sidney. **Stanley A. Brandenburg** will be branch manager of the new Detroit sales office to be opened, while **Hugh W. Robinson,** Indianapolis branch manager, will move to Cleveland to head the office that will be opened there.

• **Laurence S. Sheldrick** has been appointed as assistant to R. K. Evans, vice-president and group executive in charge of the general engines group of General Motors Corp. This group includes Allison, Electro-Motive, Cleveland Diesel and Detroit Diesel Divisions. Mr. Sheldrick joined General Motors after 21 years with the Ford Motor Co., having been chief engineer of that company for the past several years until he resigned recently.

• **David T. Siegel,** founder and president of the Ohmite Mfg. Co., Chicago, was elected to the board of trustees of Illinois Institute of Technology at the annual meeting.

Five other new members named to the Institute's board are: **Whipple Jacobs,** president of the Belden Mfg. Co.; **Claude A. Knuepfer,** president and general manager of the General Engineering Works; **T. Albert Potter,** president of the Elgin National Watch Co.; and **Harold B. Smith,** president of the Illinois Tool Works.

• **Robert S. Solinsky,** chief of the metal can and tube section, WPB, has resigned that position. Mr. Solinsky is president of Cans, Inc., Chicago.

• **L. F. Schuermann** has been elected assistant vice-president of Wheeling Corrugating Co., Wheeling, W. Va. Mr. Schuermann was until recently manager at New York. **W. J. Burrucker** has succeeded him as manager in that office.

• **H. G. Mackenzie** has been appointed manager of the E. C. Atkins & Co. Pacific Northwest Div. Mr. Mackenzie's headquarters will be at Portland, Ore.

• **Dana C. Buck** has been appointed manager of the stainless steel bureau, and **E. L. Robinson** assistant chief process metallurgist, of the Carnegie-Illinois Steel Corp., Pittsburgh District. Mr. Buck was previously stainless steel sales representative in New York. Mr. Robinson had been assistant to the manager of the metallurgical division.

• **J. F. Woessner,** formerly supervisor of the auditing staff, has been appointed general works auditor of Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds **H. S. Sylvester,** who retired after 43 years of service with the company.

• **P. W. Stickney** was appointed sales representative for the Allen Corp., Detroit. Mr. Stickney, whose office is located at 549 West Washington Boulevard, Chicago, will cover the industrial district generally known as the Chicago territory. **Lawrence H. Gardner** was appointed to the engineering staff of the company recently. Mr. Gardner has been engaged in engineering design work for various industrial equipment manufacturers since 1929.

• **F. W. Warner** has been appointed assistant engineer of the plastics divisions, Appliance and Merchandise Department, General Electric Co. **G. A. Gustafson** has been appointed manufacturing manager of the plastics divisions. Mr. Gustafson's headquarters are at 1 Plastics Avenue, Pittsfield, Mass.

• **Walter J. Ewbank,** has been appointed chief engineer for the Briggs Clarifier Co., Washington. Since joining the company in 1938, Mr. Ewbank has held a number of positions including those of assistant chief engineeer, and manager of research and development.

• **Charles H. Kanavel** has been appointed manager of the track and war products department of the national sales and service division of the B. F. Goodrich Co. Mr. Kanavel succeeds **E. F. Tomlinson,** recently named general manager of the industrial products sales division.

# OBITUARY...

• **William M. Mills,** retired secretary of the Tonawanda Iron & Steel Co., died Nov. 17 at his home in North Tonawanda, N. Y., at the age of 77. He was secretary of the firm for 32 years, retiring in 1928.

• **Carl Miller,** vice-president and general manager of the Capital Casting Co. and proprietor of the Michigan Brass & Aluminum Casting Co., Lansing, Mich., died Nov. 19.

• **David Beecroft,** associated with Bendix Aviation Corp. for the past 15 years, died recently.

• **George J. Thust,** former superintendent of the Globe Seamless Tubes Co., Milwaukee, was fatally injured when struck by an automobile Nov. 16. He was 76 years of age.

• **Arthur Polacheck,** for many years president and treasurer of the Charles Polacheck & Bros. Co., electrical fixture manufacturing firm, Milwaukee, died Nov. 11.

• **E. E. Berry,** for 10 years vice-president of the Beloit Iron Works, Beloit, Wis., and later deputy director of the WPB facilities division at Washington, died recently.

• **Frank A. Ross,** senior vice-president of Stewart-Warner, died Nov. 17. His career as an outstanding engineer in the automotive and allied accessories field began in 1908 as a member of the Warner Instrument Co., Beloit, Wis. He was 60 years of age.

# MACHINE TOOLS

. . . News and Market Activities

## Auto Plants Placing Conditional Orders

*Cleveland*

• • • **While activity in the machine tool** market from a war production standpoint has been gradually tapering off, with builders going into other lines of production for some months, the automotive manufacturers have created a stir of interest that is somewhat stimulating. Recently, builders have been receiving conditional orders from automotive companies for delivery of machine tools after the end of the war. Obviously, nothing material can be done on such orders until such a time elapses that there is no longer restrictions on the use of steel, aluminum, and other critical materials. However, these conditional orders take this into account and to the machine tool builder serve only as an indication that specific types of given equipment will be required by a certain time for the automobile manufacturers.

The immediate effect of such action is negligible, but the long term effect is perhaps stimulating. The machine tool industry has for some months justifiably bemoaned the fact that things were bad and getting worse. Now, comes the first bright beam of light. Of course, as yet it is just a tiny beam, but at least the hope is there of post war market activity.

**Some machine tool builders** have already considered terms for such orders. There has been at least one instance of builders requiring a show of good faith on such orders by requesting a 10 or 15 per cent down payment for such material as is ordered "conditionally." As far as can be determined, however, there is no indication that auto builders have shown such good faith, but it is not unreasonable to believe that within a short time this will be a general practice with machine tool builders and such terms will be acceptable to the automobile manufacturers.

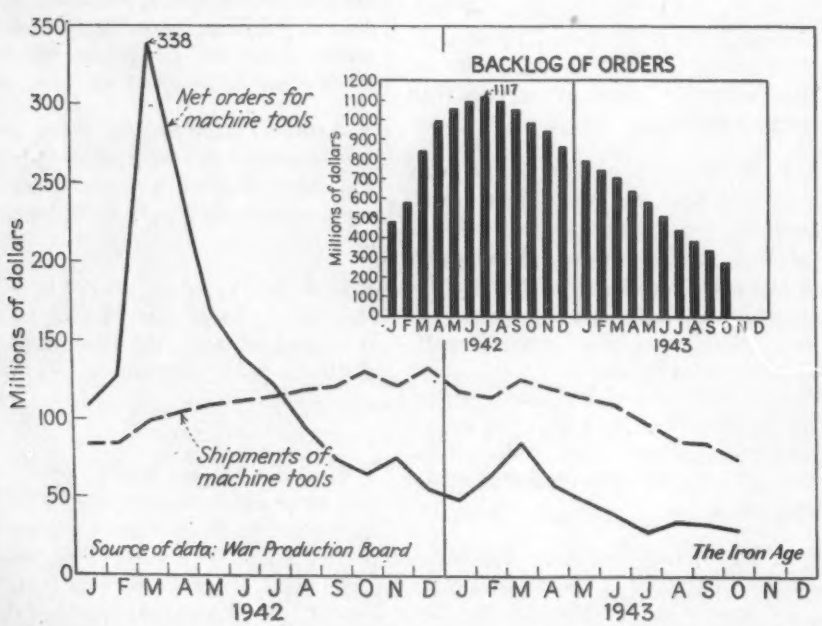
Equally interesting is the report that the automobile companies are contacting parts manufacturers with similar orders. While actual instances of such a practice have not yet been verified, it is not at all impossible and is very likely that such is the case. The conversion of the auto industry to automobile production will likely be a grand race, and any groundwork laid at the present time by these companies will stand them in good stead when the time for re-conversion comes.

•

## Machine Tool Orders and Shipments Decline

MACHINE tool shipments in October totalled approximately $76,000,000, a decline of about 11 per cent from the $85,842,000 September value, according to a preliminary report by the tools division of the War Production Board. Meanwhile the machine tool industry has continued the gradual conversion of idle facilities to the production of other essential war goods, the WPB said.

The backlog of unfilled orders declined about $47,000,000 as of Oct. 31 to approximately $286,000,000. Unfilled orders at the end of September totalled $333,119,000. New orders less cancellations declined to slightly less than $30,000,000 from the September total of $31,759,000. Cancellations during October were $4,100,000 compared with $5,800,000 in September.


338
Net orders for machine tools
BACKLOG OF ORDERS
1117
Millions of dollars
Shipments of machine tools
Source of data: War Production Board
The Iron Age
J F M A M J J A S O N D J F M A M J J A S O N D
1942
1943

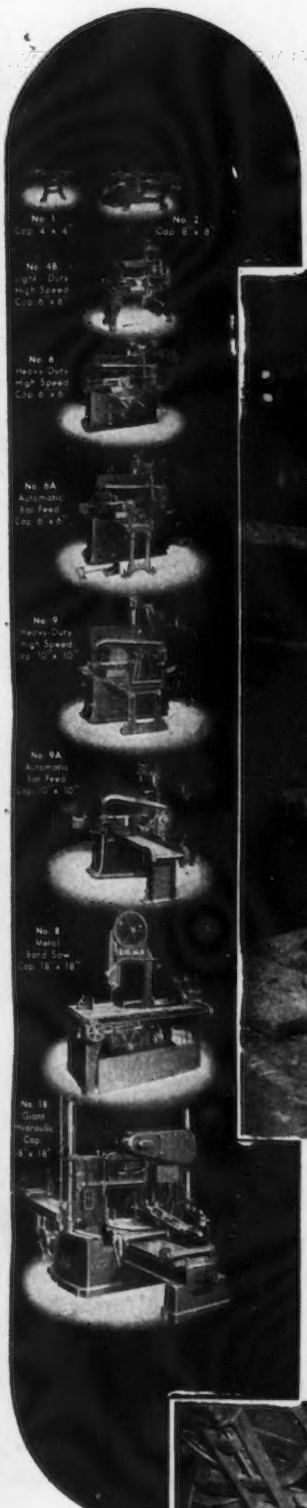
## Production Declines Bring Layoffs and Labor Trouble

*Cincinnati*

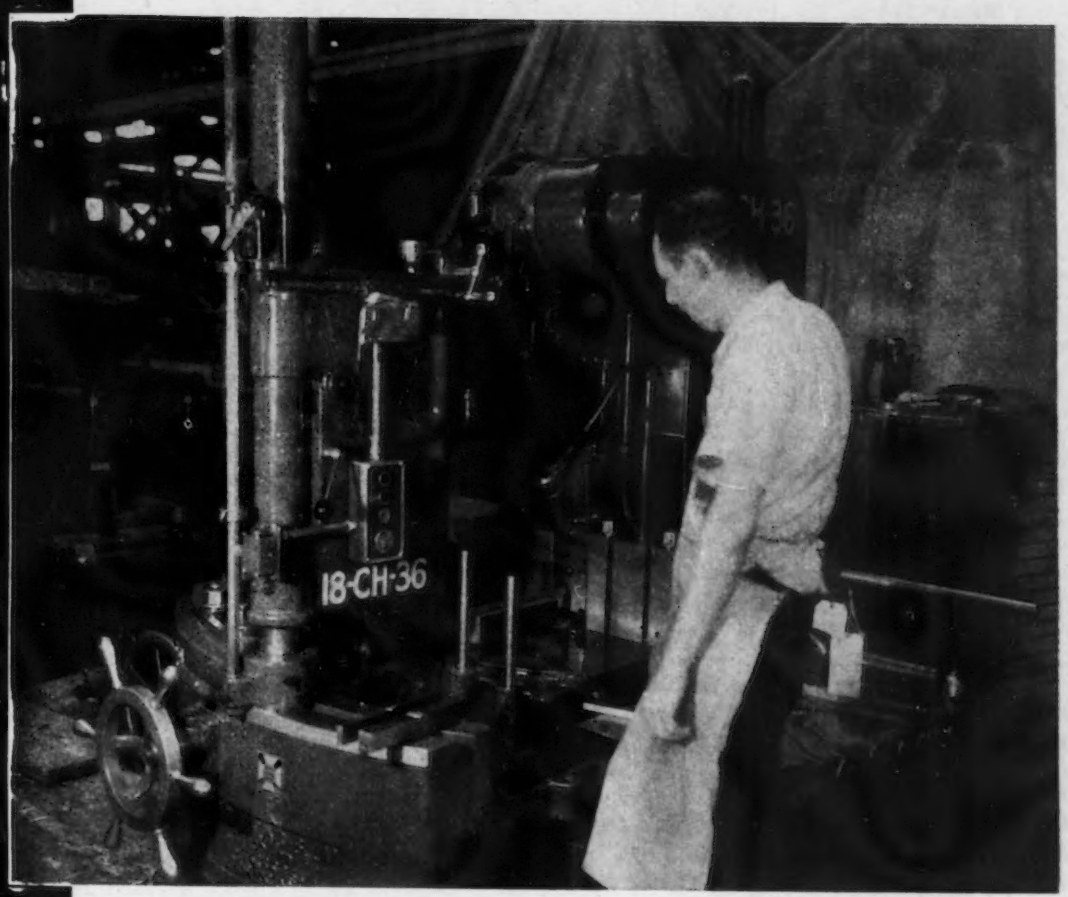
• • • **With machine tool** business definitely on the decline, production also is going downward. Here and there some layoffs are reported, but by and large, manufacturers are seeking to shift the present forces in order to extend employment as much as possible.

Some small labor difficulty was reported at the Cincinnati Bickford Tool Co. the past week as result of the decline in production. Planning to reduce its night force and shift night workers to day jobs, the company ran into reluctance on the part of one worker to accept his new shift, and when a disciplinary layoff was suggested, he declared that he would take it immediately. The next morning, the company reported that approximately one-fifth of the men walked out, and although the U. S. Conciliation Service was called in and other meetings were attempted, the company officials reported Saturday that the so-called strike was still unsettled. The matter has been very orderly and no difficulties have been reported. Production has not been affected in this plant, since there was a downward curve of output at the time the walk-out took place.

**Elsewhere** in the district, plants indicate a gradual curtailment of production in line with the declining backlogs. New business is in very small proportions as contrasted to the heavy boom business of the past few years, although of satisfactory proportions under normal peacetime conditions.



# MARVEL SAWS




(ABOVE.) The MARVEL No. 18 Hydraulic Hack Saw shown in action at the Philadelphia Navy Yard cutting a test piece of heavy plate.

## For Thin Tubes or Heavy Plate!

Two shipbuilding jobs—one at the Philadelphia Navy Yard and one at the New York Shipbuilding Corporation—demonstrate the wide variety of jobs that can be performed on MARVEL Sawing Machines. Producing a clean 45° mitered cut in tubing of thin cross-section, or sawing through thick sections of heavy plate are just two of the many jobs that can be turned out with speed and economy on MARVEL Saws.

Take advantage of MARVEL Free Technical Service! At your request a competent MARVEL Engineer will study your metal-cutting problems and make recommendations for increasing your metal sawing efficiency to meet the increased demands of defense production.

(AT RIGHT.) At the New York Shipbuilding Corporation, a MARVEL No. 8 Universal Tool Room Sawing Machine finds wide application in cutting bars, tubes, etc., either straight through or at any desired angle up to 45°. The machine will accommodate one or more pieces of stock up to 12" square in cross-section.

**ARMSTRONG-BLUM MFG. CO.**

*"The Hack Saw People"*

**5700 Bloomingdale Ave., Chicago, U.S.A.**

*Eastern Sales Office: 225 Lafayette St., New York*

# NON-FERROUS METALS

. . . News and Market Activities

## MRC Will Stockpile Aluminum Ingots

• • • **Arrangements have been** made with Metals Reserve Co. to stockpile aluminum ingot derived from scrap, Carl H. Burton, chief of the Reclamation and Inventory Branch of the Aluminum and Magnesium Division, WPB, announced in a letter to smelters of secondary aluminum ingots.

Metals Reserve will purchase for stockpiling alloys 14S, 17S, 18S, 24S, 25S, 32S, A-151S, 52S, 53S, 61S, X-76S, 142, XA-142, 195, B-195, B-195 and 355 in addition to a medium grade in two classes; one for sand and permanent mold, and one for die casting.

Purchases of B-grade ingot form any smelter will be limited to 25 per cent of total purchases of that alloy from any smelter. Stockpiling of No. 12 and deoxidizing grades will be under rigid control and prices for such ingot acquired for stockpiling will be determined by Metals Reserve before submission of the contract to the smelter.

It has been recommended that warehouse facilities be provided by Metals Reserve in New York, Philadelphia, Buffalo, Cleveland, Detroit, Chicago, Kansas City and Los Angeles. Nearest facilities will be used wherever possible.

Recommendations for purchase of ingot by Metals Reserve will be made by the Aluminum and Magnesium Division once each month and smelters' requests must be received before the tenth of that month.

### *Brass Mill Scrap Defined*

• • • **Evidence of confusion** as to the difference between brass mill scrap and copper and copper alloy scrap was brought out at a meeting of scrap metal dealers with the OPA.

Revised Price Schedule 12 defines brass mill scrap as follows: " 'Brass mill scrap' includes all kinds and grades of non-ferrous scrap materials which are a waste or by-product of any kind of fabrication of new sheet, tube, rod or other brass mill products. However, it does not include any material which meets the foregoing provisions of this definition if such material is unsuitable for brass mill use."

It follows that any scrap that is not suitable for brass mill use cannot be considered brass mill scrap and must be considered copper or copper alloy scrap. Whether scrap is or is not suitable for brass mill use generally depends upon its freedom from contamination and upon its uniformity as to grade and alloy. The mere refusal on the part of one or more brass mills to purchase a certain lot of scrap does not of itself make such scrap unsuitable for brass mill purposes. Such refusal may be due to reasons other than the character or quality of the scrap.

Scrap metal dealers should carefully guard against any possible violation of Maximum Price Regulation 20, as well as of Revised Price Schedule 12, by making sure that any scrap sold under Revised Price Schedule 12 actually meets the definition of brass mill scrap and is suitable for brass mill use.

•

### *Aluminum Uses Expanded*

*Washington*

• • • **Restrictions on the** use of aluminum in certain types of safety equipment are eased by Order L-114 as amended on Monday by WPB. Chief changes made in the amended order are:

Either primary or secondary aluminum may be used for protective safety hats.

Low-grade aluminum sand castings may be used for specified types of machine guards; hazard measuring devices; inhalators and resuscitators; oxygen breathing apparatus reducing valve housings; and supplied-air masks and hoods.

The amended order also prohibits the use of nickel silver for core wire for plastic type industrial goggles.

•

### *Tin Famine in Germany*

• • • **Further confirmation** of Germany's tin shortage, *The Metal Bulletin* reports, is brought by the news that the Reich is drastically restricting the acquisition of pewter by manufacturers. The consumption of pewter must be very small in any case, and the fact that it has been found necessary to limit the tiny quanities of tin going into this outlet makes it quite clear that near famine conditions must exist.

Even if Germany started the war with fair stocks of tin and managed to seize quite useful tonnages when it occupied its neighboring states, very little new metal could be imported during the last year or two. Ships with tin cargoes which tried to run the blockade between Japanese occupied teritory and the German Empire have been intercepted.

The canning industry has been kept going in Germany by the use of Bonderized blackplate and by substituting such materials as glass for cans.

•

### *Platinum Scrap Stocks Limited*

• • • **Because of anticipation** of increased requirements and decreased production of platinum in 1944, the WPB has issued Conservation Order M-162, as amended. The amended order provides that platinum scrap may not be held in excess of the amount produced in 30 days, and further provides that no processor or consumer may have an inventory in excess of final product deliveries during a 60-day period.

**Dealers' stocks of nonferrous scrap metals in 1943, gross weight, in short tons**

| Inventory Date (1943) | Type of Non-Ferrous Scrap Metal | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | Copper | Lead-Tin | Aluminum | Zinc | Nickel | Magnesium | |
| January 1 | 54,815 | 37,333 | 8,720 | 6,312 | 911 | 75 | 108,166 |
| January 31 | 50,231 | 35,982 | 9,137 | 6,206 | 831 | 95 | 102,482 |
| February 28 | 49,289 | 32,885 | 8,420 | 5,856 | 788 | 100 | 97,338 |
| March 31 | 47,945 | 31,528 | 8,884 | 5,731 | 796 | 105 | 94,989 |
| April 30 | 48,561 | 30,946 | 9,340 | 5,334 | 847 | 129 | 95,157 |
| May 31 | 43,964 | 30,621 | 10,163 | 5,137 | 787 | 153 | 95,825 |
| June 30 | 47,952 | 29,584 | 12,280 | 5,133 | 853 | 124 | 95,926 |
| July 31 | 47,659 | 28,855 | 15,518 | 5,520 | 783 | 154 | 98,489 |
| August 31 | 46,438 | 28,740 | 18,012 | 4,977 | 761 | 141 | 99,069 |
| September 30 | 47,829 | 30,101 | 19,173 | 4,948 | 749 | 163 | 102,963 |

## REFINER, SMELTER PRICES

*(Cents per lb. unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, del'd | 15.00 |
| Aluminum, No. 12 Fdy., (No. 2) | 13.50 |
| Aluminum, deoxidizing grades | 12.50 to 13.75 |
| Antimony, Asiatic, New York | Nominal |
| Antimony, American, f.o.b. Laredo, Tex. | 14.50 |
| Arsenic, prime white, 99% | 4.00 |
| Brass, 85-5-5-5 ingots (No. 115) | 12.25 |
| Cadmium, del'd | 90.00 |
| Cobalt, 97-99% (dollars per lb.) | $2.11 |
| Copper, electro, Conn. Valley | 12.00 |
| Copper, electro, New York | 11.75 |
| Copper, lake | 12.00 |
| Copper, beryllium, 3.75-4.25% Be; dollars per lb. contained Be | $15.00 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.5%, dollars per troy oz. | $10.00 |
| Iridium, dollars per troy oz. | $165.00 |
| Lead, St. Louis | 6.35 |
| Lead, New York | 6.50 |
| Magnesium, 99.9+%, carlots | 21.50 |
| Magnesium, 12-in. sticks, carlots | 30.00 |
| Mercury, dollars per 76-lb. flask, f.o.b. shipping point or port of entry | $191 to $193.00 |
| Nickel, electro | 35.00 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per oz. | $35.00 |
| Silver, open market, New York, cents per oz. | 44.75 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis | 8.25 |
| Zinc, New York | 8.67 |

### Copper, Copper Base Alloys

*(Mill base, cents per lb.)*

| | Extruded Shapes | Rods | Sheets |
|---|---|---|---|
| Copper | 20.87 | .... | 20.87 |
| Copper, H.R. | .... | 17.37 | .... |
| Copper, drawn | .... | 18.37 | .... |
| Low brass, 80% | .... | 20.40 | 20.15 |
| High brass | .... | .... | 19.48 |
| Red brass, 85% | .... | 20.61 | 20.36 |
| Naval brass | 20.37 | 19.12 | 24.50 |
| Brass, free cut | .... | 15.01 | .... |
| Commercial bronze, 90% | .... | 21.32 | 21.07 |
| Commercial bronze, 95% | .... | 21.53 | 21.28 |
| Manganese bronze | 24.00 | .... | 28.00 |
| Phos. bronze, A, B, 5% | .... | 36.50 | 36.25 |
| Muntz metal | 20.12 | 18.87 | 22.75 |
| Everdur, Herculoy, Olympic or equal | .... | 25.50 | 26.00 |
| Nickel silver, 5% | .... | 28.75 | 26.50 |
| Architect bronze | 19.12 | .... | .... |

### Aluminum

*(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)*

*Tubing:* 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

*Plate:* 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

*Flat Sheet:* 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

*Extruded Shapes:* "As extruded" temper; 2000-lb. base. 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

*Wire, Rod and Bar:* Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotation. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

## NON-FERROUS SCRAP METAL QUOTATIONS

*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums)*

### Copper, Copper Base Alloys

***OPA Group 1***

| | |
|---|---|
| No. 1 wire, No. 1 heavy copper | 9.75 |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75 |
| No. 2 wire, mixed heavy copper | 8.75 |
| Copper tuyeres | 8.75 |
| Light copper | 7.75 |
| Copper borings | 9.75 |
| Lead covered copper wire, cable | 6.00* |
| Lead covered telephone, power cable | 6.04 |
| Insulated copper | 5.10* |

***OPA Group 2***

| | |
|---|---|
| Bell metal | 15.50 |
| High grade bronze gears | 13.25 |
| High grade bronze solids | 11.50* |
| Low lead bronze borings | 11.50* |
| Babbitt lined brass bushings | 13.00 |
| High lead bronze solids | 10.00* |
| High lead bronze borings | 10.00* |
| Red trolley wheels | 10.75 |
| Tinny (phosphor bronze) borings | 10.50 |
| Tinny (phosphor bronze) solids | 10.50 |
| Copper-nickel solids and borings | 9.25 |
| Bronze paper mill wire cloth | 9.50 |
| Aluminum bronze solids | 9.00 |
| Soft red brass (No. 1 composition) | 9.00 |
| Soft red brass borings (No. 1) | 9.00 |
| Gilding metal turnings | 8.50 |
| Unlined standard red car boxes | 8.25 |
| Lined standard red car boxes | 7.75 |
| Cocks and faucets | 7.75 |
| Mixed brass screens | 7.75 |
| Red brass breakage | 7.50 |
| Old nickel silver solids, borings | 6.25 |
| Copper lead solids, borings | 6.25 |
| Yellow brass castings | 6.25 |

***OPA Group 3***

| | |
|---|---|
| Yellow brass soft sheet clippings | 8.625 |
| Yellow rod brass turnings | 8.375 |
| Zincy bronze borings | 8.00 |
| Zincy bronze solids | 8.00 |
| Fired rifle shells | 8.25 |
| Brass pipe | 8.00 |
| Old rolled brass | 7.75 |
| Admiralty condenser tubes | 8.00 |
| Muntz metal condenser tubes | 7.50 |
| Plated brass sheet, pipe reflectors | 7.50 |
| Manganese bronze solids | 7.25[1] |
| Manganese bronze solids | 6.25[2] |
| Manganese bronze borings | 6.50[1] |
| Manganese bronze borings | 5.50[2] |

***OPA Group 4***

| | |
|---|---|
| Automobile radiators | 7.00 |

***OPA Group 5***

| | |
|---|---|
| Refinery brass | 5.00* |

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

### Aluminum

***Plant scrap, segregated***

| | |
|---|---|
| 2S solids | 9.00 |
| All other solids | 8.50 |
| Borings and turnings | |
| W'rt alloys (17S, 18S, 32S, 52S) | 7.50 |
| High grade alloys | 7.00 |
| Low grade alloys | 6.50 |

***Plant scrap, mixed***

| | |
|---|---|
| All solids | 7.50 |
| Borings and turnings | 5.50 |

***Obsolete scrap***

| | |
|---|---|
| Pure cable | 9.00 |
| Old sheet and utensils | 7.50 |
| Old castings and forgings | 8.00 |
| Pistons, free of struts | 8.00 |
| Pistons, with struts | 6.00 |
| Old alloy sheet | 7.00 |

For old castings and forgings, pistons, sheets, add ½c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1½c. a lb.

### Magnesium

***Segregated plant scrap***

| | |
|---|---|
| Pure solids and all other solids, exempt | |
| Borings and turnings | 8.00 |

***Mixed, contaminated plant scrap***

| | |
|---|---|
| Grade 1 solids | 11.00 |
| Grade 1 borings and turnings | 7.00 |
| Grade 2 solids | 9.00 |
| Grade 2 borings and turnings | 5.00 |

For lots over 1499 lb. add 1c. per lb.

### Zinc

| | |
|---|---|
| New zinc clippings, trimmings | 7.25 |
| Engravers', lithographers' plates | 7.25 |
| Old zinc scrap | 5.75 |
| Unsweated zinc dross | 5.80 |
| Die cast slab | 5.80 |
| New die cast scrap | 4.95 |
| Radiator grilles, old and new | 4.95 |
| Old die cast scrap | 4.50 |

### Lead

Deduct 0.55c. a lb. from refined metal basing point prices for soft and hard lead inc. cable, for f.o.b. point of shipment price.

### Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

## ELECTROPLATING ANODES AND CHEMICALS

***Anodes***

*(Cents per lb., f.o.b. shipping point)*

| | |
|---|---|
| Copper: Cast, elliptical, 15 in. and longer | 25⅛ |
| Electrolytic, full size | 22⅞ |
| cut to size | 30⅛ |
| Rolled, oval, straight, 15 in. and longer | 23¼ |
| Curved | 24¼ |
| Brass: Cast, 82-20, elliptical, 15 in. and longer | 23⅝ |
| Zinc: Cast, 99.99, 16 in. and over | 16¼ |
| Nickel: 99% plus, cast | 47 |
| Rolled, depolarized | 48 |
| Silver: Rolled, 999 fine per Troy (1-9) oz., per oz. | 58 |

***Chemicals***

*(Cents per lb., delivery from New York)*

| | |
|---|---|
| Copper cyanide, tech., 100-lb. bbls. 1-5 | 5.65 |
| Copper sulphate, 99.5 crystals, bbls. | 13.00–13.50 |
| Nickel salts, single, 425-lb. bbls. | 34.00 |
| Silver cyanide, 100 oz. lots | 40.82–41.125 |
| Sodium cyanide, 96% dom., 100-lb. dms. | 0.15 |
| Zinc cyanide, 100-lb. dms. | 33.00 |
| Zinc sulphate, 89% crystals, bbls. | 6.80 |

# SCRAP

. . . News and Market Activities

## Lower Prices, Allocations Halt Rumored

• • • **Reports and rumors** brought three highlights to the surface of the scrap market last week. It was rumored that WPB may soon cease to allocate scrap . . . that some scrap, particularly alloy solids and turnings, was being sold below OPA ceiling prices . . . that the cast scrap shortage, reported most severe in the Southwest, would bring about a revision of the price structure for cast grades which would effectuate easier movement between supply and consumption areas.

Of the three, most unlikely to occur appears to be the elimination of allocations by WPB. A spokesman for

*Allocations also discussed on page 104.*

WPB, confronted with the rumor, stated to THE IRON AGE it was unlikely that WPB would forego allocations. A high official of the Scrap Institute, while expressing a lack of knowledge, was inclined to disbelieve the report. Common sense would seem to refute the claim since the major problem with scrap supply is maldistribution more than actual shortage. So long as inventories of all grades in all parts of the nation are not more than adequate, allocation is likely to continue.

**Alloy scrap,** on the other hand, appears, to be a real problem both from the standpoint of price and abundance. Detroit reports a superabundance of both turnings and solids so great that the few sales being made are going at below OPA ceiling prices. Other areas also feeling the backup of alloy grades are reporting few sales and these without the benefit of the alloy premium. The below ceiling sales are believed to be too few to noticeably affect the average market prices but the elimination of alloy premiums to encourage movement appears to be gaining broad acceptance.

WPB indicates that surpluses of any particular grade or type of scrap will be allocated to minus areas to avoid price cutting but allocation has not been quick enough at least in Detroit to ward off the cut. It was suggested by one observer that perhaps WPB was still searching for a minus area for alloy turnings and solids . . . hence the delay. In the Eastern area the waiving of alloy premiums is reported partially successful in moving small quantities of two-way and three-way turnings but no amount of effort has moved similar solids. Small quantities of straight nickel and chrome scrap have moved with the premium.

Fears of a general downward price trend in scrap based on reports of low phos plate selling below par at Detroit last week seem poorly grounded except in event of a sudden cessation of hostilities. Supplies on a nationwide basis are not excessive and only poor distribution permits overstocks to accumulate sufficiently to drive prices down. Continued allocation is expected to level out the highs and lows and maintain prices reasonably well.

A revision of cast scrap prices is strongly suggested. Cast scrap, extremely short for many months, has been adversely affected by poor movement attributed to a faulty price structure. Results of a recent meeting between the scrap processors advisory committee and officials of OPA and WPB are expected to appear in the form of revised price schedules which will increase permissible handling charges particularly on cast grades and provide an incentive for the market.

•

*BOSTON*—The labor situation has become so serious it is a question with some yards how much longer they can operate. Some of the larger ones with shears, etc., contemplate stoppage of handling material that has to be prepared. Conditions naturally slow up business. Shop scrap production averages 50 per cent below the 1942-43 peak. The salvage drive so far has supplied little worthwhile material to yards because the Industrial Salvage Division allocates its scrap salvage to consumers.

•

*PITTSBURGH* — Prices on regular heavy melting scrap are firm, and demand is in fairly good balance with supply. There have been reports that in some cases consumers are attempting to tie in purchases of carbon steel scrap with purchases of alloy scrap.

•

*BIRMINGHAM* — Cautious buying marks the scrap market in this district. No long term contracts are being placed as mills now appear disinclined to build inventories over present levels.

•

*CLEVELAND*—The alloy scrap market, especially turnings, has broken pretty badly in eastern Ohio, with alloy turnings selling for straight turnings prices in the Warren-Youngstown district, and not selling at all at Canton-Massillon.

Republic at Canton has about 65,000 tons of alloy turnings that it would actually like to sell from its own stock.

•

*BUFFALO*—While the scrap situation continues tight, Buffalo district pig iron producers appear to be all set for the winter as far as ore is concerned. Nearly 11,000 tons of industrial iron and steel scrap was collected from Oct. 20 to Nov. 20 to set a new all-time record for a single month, according to the industrial salvage committee of the Buffalo Chamber of Commerce.

•

*PHILADELPHIA*—Cast scrap is about the only grade in heavy demand although some mills would like more heavy melting grades. Although no inventories are being maintained at previous levels, mills feel that they will be able to get along on what they have and the slight shipments coming in.

•

*NEW YORK*—The scrap situation here has changed little in the past week. Alloys are still backing up and just a moderate amount of scrap is being shipped. Although there is very little tonnage of cast here, yards are reluctant to send what is available out on long hauls. Since foundries in the area are stopped from purchasing this grade, very few carloads of cast are leaving this district.

Small quantities of two-way and three-way alloy scrap have been sold by waiving premium prices for these grades. However, eliminating the premiums for solids has not aided in moving this material. Premiums for chrome bearing and nickel bearing scrap have been obtained, but here again the quantities involved are minute.

•

*CINCINNATI*—Lack of sufficient labor in yards continues to be the chief obstacle toward better flow of scrap. Two other complaints against the present set-up, the chief one being, of course, that prices are not sufficient to bring out scrap, and second, that good scrap is not available.

•

*CHICAGO*—Poor scrap flow is being offset to some extent by operation of all Carnegie-Illinois blast furnaces in this district making available more steelmaking pig for Carnegie. Excess supply of alloys and shortness of cast iron also characterize the situation.

•

*DETROIT* — Alloy scrap is in very large supply in this district and constitutes an overhanging threat to the market price structure. Dealers are reusing to handle most alloy grades particularly turnings, inasmuch as no more allocations are being received on them, and there is no market for them. Some sales of turnings have been made less the alloy premium, and in addition other sales are reported below those price levels.

## IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

| | BASIC OPEN HEARTH GRADES | | BLAST FURNACE GRADES | | | | ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Low Phos. | | Heavy Structural and Plate | | | Foundry Steel | | | | | |
| | No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling | Unbaled* Machine Shop Turnings | Mixed Borings and Turnings | Cast Iron Borings | Shovelling Turnings | No. 2 Busheling | Billet, Bloom, Forge Crops | Bar Crops, Punchings Plate Scrap and Cast Steel | 3 ft. and Under | 2 ft. and Under | 1 ft. and Under | 2 ft. and Under | 1 ft. and Under | Auto. Springs, and Crankshafts | Alloy Free Low Phos. and Sulphur Turnings | Heavy Axle and Forge Turn. First Cut | Electric Furnace Bundles |
| Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton | $20.00 | $15.00 | $15.00 | $16.00 | $17.00 | $17.50 | $25.00 | $22.50 | $21.50 | $22.00 | $22.50 | $21.50 | $22.00 | $21.00 | $18.00 | $19.50 | $21.00 |
| Cleveland, Middletown, Cincinnati, Portsmouth | 19.50 | 14.50 | 14.50 | 15.00 | 16.50 | 17.00 | 24.50 | 22.00 | 21.00 | 21.50 | 22.00 | 21.00 | 21.50 | 20.50 | 17.50 | 19.00 | 20.50 |
| Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point | 18.75 | 13.75 | 13.75 | 14.75 | 15.75 | 16.25 | 23.75 | 21.25 | 20.25 | 20.75 | 21.25 | 20.25 | 20.75 | 19.75 | 16.75 | 18.25 | 19.75 |
| Ashland, Ky. | 19.50 | 14.50 | 14.50 | 15.50 | 16.50 | 17.00 | 24.50 | 22.00 | 21.00 | 21.50 | 22.00 | 21.00 | 21.50 | 20.50 | 17.50 | 19.00 | 20.50 |
| Buffalo, N. Y. | 19.25 | 14.25 | 14.25 | 15.25 | 16.25 | 16.75 | 24.25 | 21.75 | 20.75 | 21.25 | 21.75 | 20.75 | 21.25 | 20.25 | 17.25 | 18.75 | 20.25 |
| Bethlehem, Pa.; Kokomo, Ind. | 18.25 | 13.25 | 13.25 | 14.25 | 15.25 | 15.75 | 23.25 | 20.75 | 19.75 | 20.25 | 20.75 | 19.75 | 20.25 | 19.25 | 16.25 | 17.75 | 19.25 |
| Duluth, Minn. | 18.00 | 13.00 | 13.00 | 14.00 | 15.00 | 15.50 | 23.00 | 20.50 | 19.50 | 20.00 | 20.50 | 19.50 | 20.00 | 19.00 | 16.00 | 17.50 | 19.00 |
| Detroit, Mich. | 17.85 | 12.85 | 12.85 | 13.85 | 14.85 | 15.35 | 22.85 | 20.35 | 19.35 | 19.85 | 20.35 | 19.35 | 19.85 | 18.85 | 15.85 | 17.35 | 18.85 |
| Toledo, Ohio | ..... | 12.85 | 12.85 | 13.85 | 14.85 | 15.35 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| St. Louis, Mo. | 17.50 | 12.50 | 12.50 | 13.50 | 14.50 | 15.00 | 22.50 | 20.00 | 19.00 | 19.50 | 20.00 | 19.00 | 19.50 | 18.50 | 15.50 | 17.00 | 18.50 |
| Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco | 17.06 | 12.00 | 12.00 | 13.00 | 14.00 | 14.50 | 22.00 | 19.50 | 18.50 | 19.00 | 19.50 | 18.50 | 19.00 | 18.00 | 15.00 | 16.50 | 18.00 |
| Minnequa, Colo. | 16.50 | 11.50 | 11.50 | 12.50 | 13.50 | 14.00 | 21.50 | 19.00 | 18.00 | 18.50 | 19.00 | 18.00 | 18.50 | 17.50 | 14.50 | 16.00 | 17.50 |
| Seattle, Wash. | 14.50 | 9.50 | 9.50 | 10.50 | 11.50 | 12.00 | 19.50 | 17.00 | 16.00 | 16.50 | 17.00 | 16.00 | 16.00 | 15.00 | 12.50 | 14.00 | 15.50 |

* Baled turnings are $5 per gross ton higher.

**BUNDLES:** Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

**AT NEW YORK CITY** or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at $14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

**SWITCHING CHARGES:** Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

**PITTSBURGH** basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

**MAXIMUM SHIPPING POINT PRICE**—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

**UNPREPARED SCRAP:** For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $3.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

**NEW LISTED GRADES:** Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—$2; 75 to 85% Fe—$4; under 75% Fe—$8 per ton. Mill scale of 65% or more Fe—$8 per ton. Mill cinder and grindings, shipping point maximum price of $4 per gross ton at all U. S. shipping points.

**CHEMICAL BORINGS:** No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

### RAILROAD SCRAP

| | No. 1 RR Heavy Melting | Scrap Rails | Rails for Rerolling | Scrap Rails 3 ft. and Under | Scrap Rails 2 ft. and Under | Scrap Rails 18 in. and Under |
|---|---|---|---|---|---|---|
| Cleveland, Cincinnati Ashland, Portsmouth, Middletown | $20.50 | $21.50 | $23.00 | $23.50 | $23.75 | $24.00 |
| Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown | 21.00 | 22.00 | 23.00 | 24.00 | 24.25 | 24.50 |
| Chicago, Philadelphia Sparrows Pt., Wilmington | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Birmingham, Los Angeles, San Francisco | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Buffalo | 20.25 | 21.25 | 22.75 | 23.25 | 23.50 | 23.75 |
| Detroit | 18.85 | 19.85 | 21.35 | 21.85 | 22.10 | 22.35 |
| Duluth | 19.00 | 20.00 | 21.50 | 22.00 | 22.25 | 22.50 |
| Kansas City, Mo. | 17.00 | 18.00 | 19.50 | 20.00 | 20.25 | 20.50 |
| Kokomo, Ind. | 19.25 | 20.25 | 21.75 | 22.25 | 22.50 | 22.75 |
| Seattle | 15.50 | 16.50 | 18.00 | 18.50 | 18.75 | 19.00 |
| St. Louis | 18.50 | 19.50 | 21.00 | 21.50 | 21.75 | 22.00 |

### CAST IRON SCRAP

| | Group A | Group B | Group C |
|---|---|---|---|
| No. 1 cupola cast | $18.00 | $19.00 | $20.00 |
| Clean auto cast | 18.00 | 19.00 | 20.00 |
| Unstripped motor blocks | 15.50 | 16.50 | 17.50 |
| Stove Plate | 17.00 | 18.00 | 19.00 |
| Heavy Breakable Cast | 15.50 | 16.50 | 17.50 |
| Charging Box Size Cast | 17.00 | 18.00 | 19.00 |
| Misc. Malliable | 20.00 | 21.00 | 22.00 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

## Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

**BASE PRICE SEGREGATED**

| | Solids, Lb. Cont. W | Turnings, Lb. Cont. W |
|---|---|---|
| Type 1 | $1.80 | $1.60 |
| Type 2 | 1.60 | 1.40 |
| Type 3 | 1.25 | 1.25 |
| Type 4* | 0.125 | 0.105 |
| Type 5* | 0.135 | 0.115 |

*Per lb. of scrap material.

**BASE PRICE UNSEGREGATED SOLIDS**

$1.50 per lb. contained W if 5% or more.

$1.15 per lb. contained W if over 1% and less than 5%.

$0.80 per lb. contained Mo if 1½% or more.

**BASE PRICE UNSEGREGATED TURNINGS**

$1.30 per lb. contained W if 5% or more.

$1.00 per lb. contained W if 1% and less than 5%.

$0.70 per lb. contained Mo if 1½% or more.

# Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

| (Cents Per Lb.) | Nov. 30, 1943 | Nov. 23, 1943 | Nov. 2, 1943 | Dec. 1, 1942 |
|---|---|---|---|---|
| **Flat Rolled Steel:** | | | | |
| Hot rolled sheets | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 |
| Galvanized sheets (24 ga.) | 3.50 | 3.50 | 3.50 | 3.50 |
| Hot rolled strip | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled strip | 2.80 | 2.80 | 2.80 | 2.80 |
| Plates | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, wrought iron | 3.80 | 3.80 | 3.80 | 3.80 |
| Stain's c.r. strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 |
| **Tin and Terne Plate:** (Dollars Per Base Box) | | | | |
| Tin plate, standard cokes | $5.00 | $5.00 | $5.00 | $5.00 |
| Tin plate, electrolytic | 4.50 | 4.50 | 4.50 | 4.50 |
| Special coated mfg. ternes | 4.30 | 4.30 | 4.30 | 4.30 |
| **Bars and Shapes:** (Cents Per Lb.) | | | | |
| Merchant bars | 2.15 | 2.15 | 2.15 | 2.15 |
| Cold finished bars | 2.65 | 2.65 | 2.65 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| Wrought iron bars | 4.40 | 4.40 | 4.40 | 4.40 |
| **Wire and Wire Products:** (Cents Per Lb.) | | | | |
| Plain wire | 2.60 | 2.60 | 2.60 | 2.60 |
| Wire nails | 2.55 | 2.55 | 2.55 | 2.55 |
| **Rails:** (Dollars Per Gross Ton) | | | | |
| Heavy rails | $40.00 | $40.00 | $40.00 | $40.00 |
| Light rails | 40.00 | 40.00 | 40.00 | 40.00 |
| **Semi-Finished Steel:** (Dollars Per Gross Ton) | | | | |
| Rerolling billets | $34.00 | $34.00 | $34.00 | $34.00 |
| Sheet bars | 34.00 | 34.00 | 34.00 | 34.00 |
| Slabs | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets | 40.00 | 40.00 | 40.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |
| **Wire Rods and Skelp:** (Cents Per Lb.) | | | | |
| Wire rods | 2.00 | 2.00 | 2.00 | 2.00 |
| Skelp (grvd) | 1.90 | 1.90 | 1.90 | 1.90 |

| (Per Gross Ton) | Nov. 30, 1943 | Nov. 23, 1943 | Nov. 2, 1943 | Dec. 1, 1942 |
|---|---|---|---|---|
| **Pig Iron:** | | | | |
| No. 2 fdy., Philadelphia | $25.84 | $25.84 | $25.89 | $25.89 |
| No. 2, Valley furnace | 24.00 | 24.00 | 24.00 | 24.00 |
| No. 2, Southern Cin'ti | 24.68 | 24.68 | 24.68 | 24.68 |
| No. 2, Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| No. 2, foundry, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Basic, del'd eastern Pa. | 25.39 | 25.39 | 25.39 | 25.39 |
| Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 23.50 |
| Malleable, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| L. S. charcoal, Chicago | 31.34 | 31.34 | 31.34 | 31.34 |
| Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 135.00 |
| **Scrap:** (Per Gross Ton) | | | | |
| Heavy melt'g steel, P'gh. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt'g steel, Phila. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melt'g steel, Ch'go | 18.75 | 18.75 | 18.75 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 17.85 | 17.85 | 17.85 | 17.85 |
| Low phos. plate, Youngs'n | 22.50 | 22.50 | 22.50 | 22.50 |
| No. 1 cast, Pittsburgh | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Philadelphia | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Ch'go | 20.00 | 20.00 | 20.00 | 20.00 |
| **Coke, Connellsville:** (Per Net Ton at Oven) | | | | |
| Furnace coke, prompt | $6.50 | $6.50 | $6.50 | $6.00 |
| Foundry coke, prompt | 7.50 | 7.375 | 6.875 | 6.875 |
| **Non-Ferrous Metals:** (Cents per Lb. to Large Buyers) | | | | |
| Copper, electro., Conn. | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake, New York | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin (Straits), New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 8.25 |
| Lead, St. Louis | 6.35 | 6.35 | 6.35 | 6.35 |
| Aluminum, Virgin, del'd. | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 35.00 | 35.00 | 35.00 | 35.00 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 22.50 |
| Antimony (Asiatic), N. Y. | 16.50 | 16.50 | 16.50 | 16.50 |

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 147-159.

# Composite Prices . . .

| | FINISHED STEEL | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| Nov. 30, 1943 | 2.25513c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One week ago | 2.25513c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One month ago | 2.25513c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One year ago | 2.26190c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |

| | FINISHED STEEL HIGH | FINISHED STEEL LOW | PIG IRON HIGH | PIG IRON LOW | SCRAP STEEL HIGH | SCRAP STEEL LOW |
|---|---|---|---|---|---|---|
| 1943 | 2.25513c., | 2.25513c., | $23.61 | $23.61 | $19.17 | $19.17 |
| 1942 | 2.26190c., | 2.26190c., | 23.61 | 23.61 | 19.17 | 19.17 |
| 1941 | 2.43078c., | 2.43078c., | $23.61, Mar. 20 | $23.45, Jan. 2 | $22.00, Jan. 7 | $19.17, Apr. 10 |
| 1940 | 2.30467c., Jan. 2 | 2.24107c., Apr. 16 | 23.45, Dec. 23 | 22.61, Jan. 2 | 21.83, Dec. 30 | 16.04, Apr. 9 |
| 1939 | 2.35367c., Jan. 3 | 2.26689c., May 16 | 22.61, Sept. 19 | 20.61, Sept. 12 | 22.50, Oct. 3 | 14.08, May 16 |
| 1938 | 2.58414c., Jan. 4 | 2.27207c., Oct. 18 | 23.25, June 21 | 19.61, July 6 | 15.00, Nov. 22 | 11.00, June 7 |
| 1937 | 2.58414c., Mar. 9 | 2.32263c., Jan. 4 | 23.25, Mar. 9 | 20.25, Feb. 16 | 21.92, Mar. 30 | 12.67, June 9 |
| 1936 | 2.32263c., Dec. 28 | 2.05200c., Mar. 10 | 19.74, Nov. 24 | 18.73, Aug. 11 | 17.75, Dec. 21 | 12.67, June 9 |
| 1935 | 2.07642c., Oct. 1 | 2.06492c., Jan. 8 | 18.84, Nov. 5 | 17.83, May 14 | 13.42, Dec. 10 | 10.33, Apr. 29 |
| 1934 | 2.15367c., Apr. 24 | 1.95757c., Jan. 2 | 17.90, May 1 | 16.90, Jan. 27 | 13.00, Mar. 13 | 9.50, Sept. 25 |
| 1933 | 1.95578c., Oct. 3 | 1.75836c., May 2 | 16.90, Dec. 5 | 13.56, Jan. 3 | 12.25, Aug. 8 | 6.75, Jan. 3 |
| 1932 | 1.89196c., July 5 | 1.83901c., Mar. 1 | 14.81, Jan. 5 | 13.56, Dec. 6 | 8.50, Jan. 12 | 6.43, July 5 |
| 1931 | 1.99626c., Jan. 13 | 1.86586c., Dec. 29 | 15.90, Jan. 6 | 14.79, Dec. 15 | 11.33, Jan. 6 | 8.50, Dec. 29 |
| 1930 | 2.25488c., Jan. 7 | 1.97319c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.31773c., May 28 | 2.26498c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# . . . Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, mutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

| Basing Point → / Product ↓ | Pittsburgh | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown, Ohio | Gulf Ports, Cars | Pacific Ports, Cars[10] | DELIVERED TO Detroit | New York | Philadelphia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SHEETS** | | | | | | | | | | | | | | | |
| Hot rolled | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.20¢ | 2.10¢ | | 2.65¢ | 2.20¢ | 2.34¢ | 2.27¢ |
| Cold rolled[1] | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | | 3.70¢ | 3.15¢ | 3.39¢ | 3.37¢ |
| Galvanized (24 ga.) | 3.50¢ | 3.50¢ | 3.50¢ | | 3.50¢ | 3.50¢ | 3.50¢ | 3.50¢ | 3.60¢ | 3.50¢ | | 4.05¢ | | 3.74¢ | 3.67¢ |
| Enameling (20 ga.) | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | | 3.35¢ | | 3.45¢ | 3.35¢ | | 4.00¢ | 3.45¢ | 3.71¢ | 3.67¢ |
| Long ternes[2] | 3.80¢ | | 3.80¢ | | | | | | | | | 4.55¢ | | 4.16¢ | 4.12¢ |
| **STRIP** | | | | | | | | | | | | | | | |
| Hot rolled[3] | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | | | 2.10¢ | | 2.75¢ | 2.20¢ | 2.46¢ | |
| Cold rolled[4] | 2.80¢ | 2.90¢ | | 2.80¢ | | | 2.80¢ | (Worcester—3.00¢) | | | | | 2.90¢ | 3.16¢ | |
| Cooperage stock | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | | 2.56¢ | |
| Commodity C-R | 2.95¢ | 3.05¢ | | 2.95¢ | | | 2.95¢ | (Worcester—3.35¢) | | | | | 3.05¢ | 3.31¢ | |
| **TIN MILL PRODUCTS** | | | | | | | | | | | | | | | |
| Coke tin plate, base box | $5.00 | $5.00 | $5.00 | | | | | | $5.10 | | | | | 5.36¢ | 5.32¢ |
| .50 } Electro tin plate, box | $4.50 | $4.50 | $4.50 | | | | | | | | | | | | |
| .75 } Electro tin plate, box | $4.65 | | $4.65 | | | | | | | | | | | | |
| Black plate, 29 gage[5] | 3.05¢ | 3.05¢ | 3.05¢ | | | | | | 3.15¢ | | | 4.05¢[12] | | | 3.37¢ |
| Mfg. ternes, special box | $4.30 | $4.30 | $4.30 | | | | | | $4.40 | | | | | | |
| **BARS** | | | | | | | | | | | | | | | |
| Carbon steel | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | (Duluth—2.25¢) | | | 2.50¢ | 2.80¢ | 2.25¢ | 2.49¢ | 2.47¢ |
| Rail steel[6] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | | 2.50¢ | 2.80¢ | | | |
| Reinforcing (billet)[7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.50¢ | 2.55¢[13] | 2.25¢ | 2.39¢ | |
| Reinforcing (rail)[7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | 2.50¢ | 2.55¢[13] | 2.25¢ | | 2.47¢ |
| Cold finished[8] | 2.65¢ | 2.65¢ | 2.65¢ | 2.65¢ | | 2.65¢ | | | (Detroit—2.70¢) | | | | | 2.99¢ | 2.97¢ |
| Alloy, hot rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | (Bethlehem, Massillon, Canton—2.70¢) | | | | | | 2.80¢ | | |
| Alloy, cold drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | | 3.45¢ | | |
| | | | | | | | | (Coatesville and Claymont—2.10¢) | | | | | | | |
| **PLATES** | | | | | | | | | | | | | | | |
| Carbon steel | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | 2.35¢ | | 2.45¢ | 2.65¢ | 2.32¢ | 2.29¢ | 2.15¢ |
| Floor plates | 3.35¢ | 3.35¢ | | | | | | | | | 3.70¢ | 4.00¢ | | 3.71¢ | 3.67¢ |
| Alloy | 3.50¢ | 3.50¢ | | | (Coatesville—3.50¢) | | | | | | 3.95¢ | 4.15¢ | | 3.70¢ | 3.59¢ |
| **SHAPES** | | | | | | | | | | | | | | | |
| Structural | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | (Bethlehem—2.10¢) | | | | 2.45¢ | 2.75¢ | | 2.27¢ | 2.215¢ |
| **SPRING STEEL, C-R** | | | | | | | | | | | | | | | |
| 0.26 to 0.50 Carbon | 2.80¢ | | | 2.80¢ | | | (Worcester—3.00¢) | | | | | | | | |
| 0.51 to 0.75 Carbon | 4.30¢ | | | 4.30¢ | | | (Worcester—4.50¢) | | | | | | | | |
| 0.76 to 1.00 Carbon | 6.15¢ | | | 6.15¢ | | | (Worcester—6.35¢) | | | | | | | | |
| 1.01 to 1.25 Carbon | 8.35¢ | | | 8.35¢ | | | (Worcester—8.55¢) | | | | | | | | |
| **WIRE[9]** | | | | | | | | | | | | | | | |
| Bright[14] | 2.60¢ | 2.60¢ | | 2.60¢ | 2.60¢ | | (Worcester—2.70¢) | | | | | 3.10¢ | | | 2.92¢ |
| Galvanized | add proper size extra and galvanized extra to bright wire base, above. | | | | | | | | | | | | | | |
| Spring (High Carbon) | 3.20¢ | 3.20¢ | | 3.20¢ | | | (Worcester—3.30¢) | | | | | 3.70¢ | | | 3.52¢ |
| **PILING** | | | | | | | | | | | | | | | |
| Steel sheet | 2.40¢ | 2.40¢ | | | | 2.40¢ | | | | | | 2.95¢ | | | 2.72¢ |

[1] Mill run sheets are 10c per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 29,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base; Parkersburg Iron & Steel may quote $2.25 per hundred f.o.b. Parkersburg, W. Va. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points; Parkersburg Iron & Steel may quote $3.85 per hundred f.o.b. Parkersburg, W. Va. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $40.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semi-finished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

## WAREHOUSE PRICES

*Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.*

| Cities | SHEETS | | | STRIP | | Plates ¼ in. and heavier | Structural Shapes | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot Rolled (10 gage) | Cold Rolled | Galvanized (24 gage) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled, NE 8617-20 | Hot Rolled, NE 9442-45 Ann. | Cold Drawn, NE 8617-20 | Cold Drawn, NE 9442-45 Ann. |
| Philadelphia | $3.518 | $4.872[6] | $5.018a | $3.922 | $4.772 | $3.606 | $3.666 | $3.882 | $4.072 | .... | $7.116 | .... | .... |
| New York | 3.590 | 4.613[3] | 5.010 | 3.974[6] | 4.774 | 3.768 | 3.758 | 3.853 | 4.103 | $8.008 | 7.158 | $7.303 | $8.453 |
| Boston | 3.774 | 4.744[9] | 5.224[9] | 4.106 | 4.715 | 3.912 | 3.912 | 4.044 | 4.144 | 6.162 | 7.312 | 7.344 | 8.494 |
| Baltimore | 3.394 | 4.852 | 4.894 | 3.902 | 4.752 | 3.594 | 3.758 | 3.802 | 4.052 | .... | .... | .... | .... |
| Norfolk | 3.771 | 4.965 | 5.371 | 4.165 | 4.865 | 3.971 | 4.002 | 4.065 | 4.165 | .... | .... | .... | .... |
| Washington | 3.596 | 4.841 | 5.196[4] | 4.041 | 4.741 | 3.796 | 3.930 | 3.941 | 4.041 | .... | .... | .... | .... |
| Chicago | 3.25 | 4.20 | 5.23 | 3.60 | 4.65[17] | 3.55 | 3.55 | 3.50 | 3.75 | 5.75 | 6.90 | 6.85 | 8.00 |
| Milwaukee | 3.387 | 4.337[2] | 5.272[4] | 3.737 | 4.787[17] | 3.687 | 3.687 | 3.637 | 3.887 | 5.987 | 7.137 | 7.087 | 8.237 |
| Cleveland | 3.35 | 4.40 | 4.877[4] | 3.60 | 4.45 | 3.40 | 3.588 | 3.35 | 3.75 | 5.956 | 7.106 | 6.85 | 8.00 |
| Buffalo | 3.35 | 4.40 | 4.754 | 3.819 | 4.669 | 3.63 | 3.40 | 3.35 | 3.75 | 5.75 | 6.90 | 6.85 | 8.00 |
| Detroit | 3.45 | 4.50 | 5.004 | 3.70 | 5.909[17] | 3.609 | 3.681 | 3.45 | 3.80 | 6.08 | 7.23 | 7.159 | 8.309 |
| Cincinnati | 3.425 | 4.475[3] | 4.825[5] | 3.675 | 4.711 | 3.611 | 3.691 | 3.611 | 4.011 | .... | .... | .... | .... |
| St. Louis | 3.397 | 4.247[3] | 5.172[4] | 3.747 | 4.931[17] | 3.697 | 3.697 | 3.647 | 4.031 | 6.131 | 7.281 | 7.231 | 8.381 |
| Pittsburgh | 3.35 | 4.40 | 4.75 | 3.60 | 4.45 | 3.40 | 3.40 | 3.35 | 3.75 | 5.75 | 7.15 | 6.85 | 8.25 |
| St. Paul | 3.51 | 4.46 | 5.257[4] | 3.86 | 4.35[17] | 3.813[3] | 3.813[3] | 3.763[3] | 4.361 | 6.09 | 7.24 | 7.561 | 8.711 |
| Omaha | 3.865 | 5.443 | 5.608[4] | 4.215 | .... | 4.166 | 4.166 | 4.116 | 4.443 | .... | .... | .... | .... |
| Indianapolis | 3.58 | 3.58 | 4.568 | 4.918 | 3.768 | 4.78 | 3.63 | 3.58 | 3.98 | 6.08 | 7.23 | 7.18 | 8.33 |
| Birmingham | 3.45 | .... | 4.75 | 3.70 | .... | 3.56 | 3.56 | 3.50 | 4.43 | .... | .... | .... | .... |
| Memphis | 3.857 | 4.66 | 5.25 | 4.10 | .... | 3.95 | 3.95 | 3.90 | 4.31 | .... | .... | .... | .... |
| New Orleans | 3.95 | 4.95 | 5.25 | 4.20 | .... | 3.90 | 3.90 | 4.16 | 4.60 | .... | .... | .... | .... |
| Houston | 3.763 | 5.573[2] | 6.313[1] | 4.313 | .... | 4.25 | 4.25 | 3.75 | 6.373[3] | 7.223 | 8.323 | 8.323 | 9.373 |
| Los Angeles | 5.00 | 7.20[3] | 6.10[4] | 4.95 | 5.613[15] | 4.95 | 4.65 | 4.40 | 5.583 | 8.304 | 9.404 | 9.404 | 10.454 |
| San Francisco | 4.55[14] | 7.30[4] | 6.35[4] | 4.50[14] | 7.333[17] | 4.65[14] | 4.35[14] | 4.15[14] | 5.333 | 8.304 | 9.404 | 9.404 | 10.454 |
| Seattle | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Portland | 4.65[11] | 6.80[4] | 5.75[4] | 4.75[11] | .... | 4.75[11] | 4.45[11] | 4.45[11] | 5.533 | 8.304 | 9.404 | 8.304 | 9.404 |
| Salt Lake City | 4.53[17] | .... | 6.17[18] | 5.53[17] | .... | 4.96[17] | 4.96[17] | 4.88[17] | 5.96 | .... | .... | .... | .... |

## NATIONAL EMERGENCY (NE) STEELS

*(Hot Rolled Mill Extras for Alloy Content)*

| Designation | CHEMICAL COMPOSITION LIMITS, PER CENT | | | | | | | | Basic Open-Hearth | | Electric Furnace | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carbon | Manganese | Phosphorus Max. | Sulphur Max. | Silicon | Chromium | Nickel | Molybdenum | Bars and Bar Strip | Billets, Blooms and Slabs | Bars and Bar Strip | Billets, Blooms and Slabs |
| NE 1330 | .28/ .33 | 1.60/1.90 | .040 | .040 | .20/ .35 | | | | .10c | $2.00 | | |
| NE 1335 | .33/ .38 | 1.60/1.90 | .040 | .040 | .20/ .35 | | | | .10 | 2.00 | | |
| NE 1340 | .38/ .43 | 1.60/1.90 | .040 | .040 | .20/ .35 | | | | .10 | 2.00 | | |
| NE 1345 | .43/ .48 | 1.60/1.90 | .040 | .040 | .20/ .35 | | | | .10 | 2.00 | | |
| NE 1350 | .48/ .53 | 1.60/1.90 | .040 | .040 | .20/ .35 | | | | .10 | 2.00 | | |
| NE 8613 | .12/ .17 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8615 | .13/ .18 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8617 | .15/ .20 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8620 | .18/ .23 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8630 | .28/ .33 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | 15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8635 | .33/ .38 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8637 | .35/ .40 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8640 | .38/ .43 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8642 | .40/ .45 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8645 | .43/ .48 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8650 | .48/ .53 | .75/1.00 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .15/ .25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8720 | .18/ .23 | .70/ .90 | .040 | .040 | .20/ .35 | .40/ .60 | .40/ .70 | .20/ .30 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9255 | .50/ .60 | .70/ .95 | .040 | .040 | 1.80/2.20 | | | | .40 | 8.00 | | |
| NE 9260 | .55/ .65 | .70/1.00 | .040 | .040 | 1.80/2.20 | | | | .40 | 8.00 | | |
| NE 9261 | .55/ .65 | .70/1.00 | .040 | .040 | 1.80/2.20 | .10/ .25 | | | .65 | 13.00 | | |
| NE 9262 | .55/ .65 | .70/1.00 | .040 | .040 | 1.80/2.20 | .25/ .40 | | | .65 | 13.00 | | |
| NE 9415 | .13/ .18 | .30/1.10 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .75 | 15.00 | 1.25 | $25.00 |
| NE 9420 | .18/ .23 | .30/1.10 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ 60 | .08/ .15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9422 | .20/ .25 | .30/1.10 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9425 | .23/ .28 | .30/1.10 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9430 | .28/ .33 | .30/1.20 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ 60 | .08/ 15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9435 | .33/ .38 | .30/1.20 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9437 | .35/ .40 | .30/1.20 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ 60 | .08/ .15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9440 | .38/ .43 | .30/1.20 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .75 | 15.00 | 1.25 | 25 00 |
| NE 9442 | .40/ .45 | 1.00/1.30 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9445 | .43/ .48 | 1.00/1.30 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9450 | .48/ .53 | 1.20/1.50 | .040 | .040 | .20/ .35 | .30/ .50 | .30/ .60 | .08/ .15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9637* | .35/ .40 | 1.20/1.50 | .040 | .040 | .40/ .60 | .40/ .60 | .40/ .70 | .15/ .25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9640* | .38/ .43 | 1.20/1.50 | .040 | .040 | .40/ .60 | .40/ .60 | .40/ .70 | .15/ .25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9642* | .40/ .45 | 1.20/1.50 | .040 | .040 | .40/ .60 | .40/ .60 | .40/ .70 | .15/ .25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9645* | .43/ .48 | 1.20/1.50 | .040 | .040 | .40/ .60 | .40/ .60 | .40/ .70 | .15/ .25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9650* | .48/ .53 | 1.20/1.50 | .040 | .040 | .40/ .60 | .40/ .60 | .40/ .70 | .15/ .25 | 1.20 | 24.00 | 1.70 | 34.00 |

## BASE QUANTITIES

*Standard unless otherwise keyed on prices.*

**HOT ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD ROLLED:** Sheets, 400 to 1999 lb.; strip, extras on all quantities; bars, 1500 to 39,999 lb.; NE alloy bars, 1000 to 39,999 lb.

**EXCEPTIONS:** (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 to 39,999 lb. (15) 1000 to 39,999 lb. (16) 1500 to 39,999 lb. (17) 2000 to 39,999 lb. (18) 3500 to 39,999 lb.

(a) Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Recommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

## PRICES

### SEMI-FINISHED STEEL

***Billets, Blooms and Slabs***

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Delivered prices do not reflect new three per cent tax on freight rates.

| | *Per Gross Ton* |
|---|---|
| Rerolling | $34.00 |
| Forging quality | 40.00 |

Connors Steel Co., Birmingham, may charge $50.69 for rerolling billets.

***Alloy Steel***

| | |
|---|---|
| Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton | 54.00 |

***Shell Steel***

| | *Per Gross Ton* |
|---|---|
| 3 in. to 12 in. | $52.00 |
| 12 in. to 18 in. | 54.00 |
| 18 in. and over | 56.00 |

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are $2.00 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

***Sheet Bars***

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

| | *Per Gross Ton* |
|---|---|
| Open hearth or bessemer | $34.00 |

***Skelp***

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

| | *Per Lb.* |
|---|---|
| Grooved, universal and sheared | 1.90c. |

***Wire Rods***

*(No. 5 to 9/32 in.)*

| | *Per Lb.* |
|---|---|
| Pittsburgh, Chicago, Cleveland | 2.00c. |
| Worcester, Mass. | 2.10c. |
| Birmingham | 2.00c. |
| San Francisco | 2.50c. |
| Galveston | 2.25c. |

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse)*

| | *Base per lb.* |
|---|---|
| High speed | 67c. |
| Straight molybdenum | 54c. |
| Tungsten-molybdenum | 57½c. |
| High-carbon-chromium | 43c. |
| Oil hardening | 24c. |
| Special carbon | 22c. |
| Extra carbon | 18c. |
| Regular carbon | 14c. |

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

### CORROSION AND HEAT-RESISTING STEEL

*(Per lb. base price, f.o.b. Pittsburgh)*

***Chromium-Nickel Alloys***

| | No. 304 | No. 302 |
|---|---|---|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25.00c. | 24.00c. |
| Plates | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets | 36.00c. | 34.00c. |
| Hot rolled strip | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire | 25.00c. | 24.00c. |

***Straight-Chromium Alloys***

| | No. 410 | No. 430 | No. 442 | No. 446 |
|---|---|---|---|---|
| F.Billets | 15.725c. | 16.15c. | 19.125c. | 23.375c. |
| Bars | 18.50c. | 19.00c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22.00c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29.00c. | 32.50c. | 36.50c. |
| Hot strip | 17.00c. | 17.50c. | 24.00c. | 35.00c. |
| Cold strip | 22.00c. | 22.50c. | 32.00c. | 52.00c. |

***Chromium-Nickel Clad Steel (20%)***

| | No. 304 |
|---|---|
| Plates | 18.00c.* |
| Sheets | 19.00c. |

*Includes annealing and pickling.


# THOMAS FLEXIBLE COUPLINGS

Since 1914 "THOMAS" has produced the most dependable couplings made. They are specified by engineers and designers because no other type or make of coupling has these features:

**NO BACKLASH**
**NO WEAR**
**NO LUBRICATION**
**NO THRUST**
**FREE END THRUST**

Backlash shocks and vibrations are the destructive forces that take annually in maintenance, millions of dollars from the industries. This terrific drain, however, is greatly lessened by the adoption of Thomas Flexible Couplings.

For specifications on couplings for all standard purposes write for the new Thomas Catalog with complete engineering data.

*"BUILT TO LAST A LIFETIME"*

THOMAS FLEXIBLE COUPLING CO.

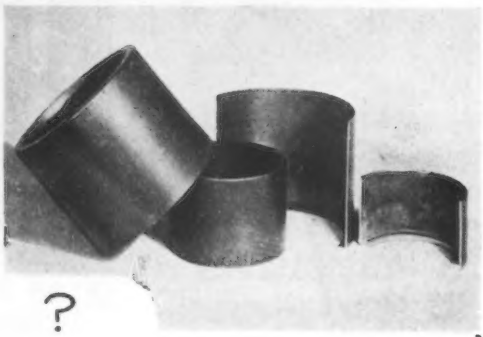
WARREN, PENNSYLVANIA

T-4

## NEW PRESSING DEVELOPMENTS

*For Many Industries*

Eliminate costly machining?
Provide uniform products?
Strengthen your product?
Make it lighter?
Relieve your bottlenecks?
Save you $ and worry?



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# LEE
## *Quality Springs*

ALL SHAPES · ALL SIZES · ALL MATERIALS

LEE SPRING COMPANY, Inc.

30 MAIN STREET BROOKLYN N.Y.

LEE-BUILT TRADE MARK SPRINGS


## PRICES

### BOLTS, NUTS, RIVETS, SET SCREWS

***Bolts and Nuts***
*(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)*

**Machine and Carriage Bolts:**

| | *Per Cent Off List* |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 65½ |
| 9/16 & ⅝ in. x 6 in. & shorter | 63½ |
| ¾ to 1 in. x 6 in. & shorter | 61 |
| 1⅛ in. and larger, all length | 59 |
| All diameters over 6 in. long | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

**Nuts, Cold Punched or Hot Pressed:**
*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 62 |
| 9/16 to 1 in. inclusive | 59 |
| 1⅛ to 1½ in. inclusive | 57 |
| 1⅝ in. and larger | 56 |

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

| **Semi-Fin. Hexagon Nuts** | **U.S.S.** | **S.A.E.** |
|---|---|---|
| 7/16 in. and smaller | .. | 64 |
| ½ in. and smaller | 62 | .. |
| ½ in. through 1 in. | .. | 60 |
| 9/16 to 1 in. | 59 | .. |
| 1⅛ in. through 1½ in. | 57 | 58 |
| 1⅝ in. and larger | 56 | .. |

In full container lots, 10 per cent additional discount.

***Stove Bolts***

| | |
|---|---|
| Packages, nuts loose | 71 and 10 |
| In packages, with nuts attached | 71 |
| In bulk | 80 |

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

***Large Rivets*** *(½ in. and larger)*

| | *Base per 100 lb.* |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | $3.75 |

***Small Rivets*** *(7/16 in. and smaller)*

| | *Per Cent Off List* |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 65 and 5 |

***Cap and Set Screws***

| | *Per Cent Off List* |
|---|---|
| Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes | 36 |
| Fillister head cap, listed sizes | 51 |

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### RAILS, TRACK SUPPLIES
*(F.o.b. Mill)*

| | |
|---|---|
| Standard rails, heavier than 60 lb., No. 1 O.H., gross ton | $40.00 |
| Angles bars, 100 lb. | 2.70 |
| *(F.o.b. Basing Points)* | *Per Gross Ton* |
| Light rails (from billets) | $40.00 |
| Light rails (from rail steel) | 39.00 |
| | *Base per Lb.* |
| Cut spikes | 3.00c. |
| Screw spikes | 5.15c. |
| Tie plates, steel | 2.15c. |
| Tie plates, Pacific Coast | 2.30c. |
| Track bolts | 4.75c. |
| Track bolts, heat treated, to railroads | 5.00c. |
| Track bolts, jobbers discount | 63-5 |

Basing points, light rails, Pittsburgh, Chicago, Birmingham: spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

### ROOFING TERNE PLATE
*(F.o.b. Pittsburgh, 112 Sheets)*

| | 20x14 in. | 20x28 in. |
|---|---|---|
| 8-lb. coating I.C. | $6.00 | $12.00 |
| 15-lb. coating I.C. | 7.00 | 14.00 |
| 20-lb. coating I.C. | 7.50 | 15.00 |

## PRICES

### ELECTRICAL SHEETS

*(Base, f.o.b. Pittsburgh)*

| | *Per Lb.* |
|---|---|
| Field grade | 3.20c. |
| Armature | 3.55c. |
| Electrical | 4.05c. |
| Motor | 4.95c. |
| Dynamo | 5.65c. |
| Transformer 72 | 6.15c. |
| Transformer 65 | 7.15c. |
| Transformer 58 | 7.65c. |
| Transformer 52 | 8.45c. |

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

### WIRE PRODUCTS

*To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham*

| | *Base per Keg* |
|---|---|
| Standard wire nails | $2.55 |
| Coated nails | 2.55 |
| Cutnails, carloads | 3.85 |
| | *Base per 100 Lb.* |
| Annealed fence wire | $3.05 |
| Annealed galvanized fence wire | 3.40 |
| | *Base Column* |
| Woven wire fence* | 67 |
| Fence posts (carloads) | 69 |
| Single loop bale ties | 59 |
| Galvanized barbed wire† | 70 |
| Twisted barbless wire | 70 |

*15½ gage and heavier. †On 80-rod spools in carload quantities.

### WELDED PIPE AND TUBING

*Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills*

*(F.o.b. Pittsburgh only on wrought pipe)*
*Base Price—$200 per Net Ton*

| | *Black* | *Galv.* |
|---|---|---|
| ***Steel (Butt Weld)*** | | |
| ½ in. | 63½ | 51 |
| ¾ in. | 66½ | 55 |
| 1 to 3 in. | 68½ | 57½ |
| ***Wrought Iron (Butt Weld)*** | | |
| ½ in. | 25 | 3½ |
| ¾ in. | 30 | 10 |
| 1 and 1¼ in. | 34 | 16 |
| 1½ in. | 38 | 18½ |
| 2 in. | 37½ | 18 |
| ***Steel (Lap Weld)*** | | |
| 2 in. | 61 | 49½ |
| 2½ and 3 in. | 64 | 52½ |
| 3½ to 6 in. | 66 | 54½ |
| ***Wrought Iron (Lap Weld)*** | | |
| 2 in. | 30½ | 12 |
| 2½ to 3½ in. | 31½ | 14½ |
| 4 in. | 33½ | 18 |
| 4½ to 8 in. | 32½ | 17 |
| ***Steel (Butt, extra strong, plain ends)*** | | |
| ½ in. | 61½ | 50½ |
| ¾ in. | 65½ | 54½ |
| 1 to 3 in. | 67 | 57 |
| ***Wrought Iron (Same as Above)*** | | |
| ½ in. | 25 | 6 |
| ¾ in. | 31 | 12 |
| 1 to 2 in. | 38 | 19½ |
| ***Steel (Lap, extra strong, plain ends)*** | | |
| 2 in. | 59 | 48½ |
| 2½ and 3 in. | 63 | 52½ |
| 3½ to 6 in. | 66½ | 56 |
| ***Wrought Iron (Same as Above)*** | | |
| 2 in. | 33½ | 15½ |
| 2½ to 4 in. | 39 | 22½ |
| 4½ to 6 in. | 37½ | 21 |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.


*Announcing*

**PLAST-O-LOCK**

**A *New* COLLET-TYPE GAUGE *that multiplies the life of STANDARD PLUG GAUGES***

This new development, PLAST-O-LOCK (pat. applied for), by Turner brings to industry a plastic collet-type gauge that greatly increases the life of standard plug gauges. This PLAST-O-LOCK gauge features a collet of plastic, slotted and tapered to fit into the tapered end of a standard plastic handle. With PLAST-O-LOCK, the holding area of plastic against the gauge's surface does not scratch or burr, thereby allowing use of most of the gauge's length. For example, as the "go" and "no go" ends are worn beyond allowed tolerances they are simply cut off, thus leaving an unused end ready for gauging. To illustrate further, if a boring no deeper than ⅛" is being checked, as many as 8 fresh gauging sections may be obtained from one standard length "go" gauge as furnished with Turner's PLAST-O-LOCK. This obviously eliminates the necessity of salvaging used gauges.

• • •

Turner Gauging members for use with Turner's PLAST-O-LOCK collet-type gauge can be obtained in steel, chrome, tungsten carbide or Nor-Bide. When sending your order specify the type you require.

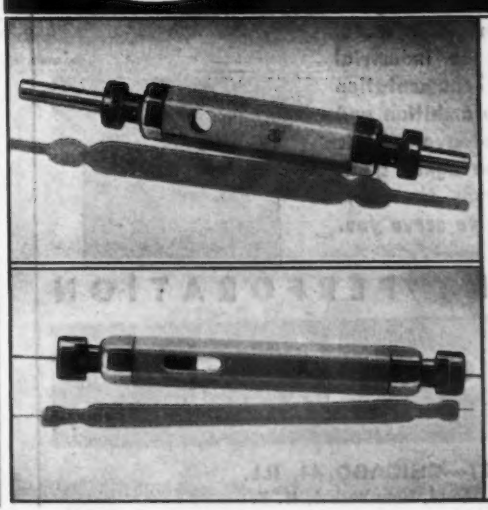
For a complete description of the PLAST-O-LOCK Gauge, wire or write us on your company stationery.

★ *Features* ★

1. Multiplies the life of the plug gauge.
2. Collet will not mar a lapped or polished surface.
3. Used with plastic handle the gauge has a more sensitive feel in the hands of an inspector.
4. Is easy to make length adjustment because slot is provided for end wrench.
5. PLAST-O-LOCK size range from .050 to .690.

TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY
2629 HILTON ROAD • • • • FERNDALE, MICH.



*Sizes* AVAILABLE

| Plug Size Range | Length of "Go" Gauge | Length of "No Go" Gauge |
|---|---|---|
| .050 to .099 | 1⅞ | 1⅜ |
| .100 to .149 | 2 | 1½ |
| .150 to .199 | 2¼ | 1¾ |
| .200 to .249 | 2½ | 2 |
| .250 to .499 | 3 | 2 |
| .500 to .690 | 3½ | 2½ |

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

| | No. 2 Foundry | Basic | Bessemer | Malleable | Low Phosphorus | Charcoal |
|---|---|---|---|---|---|---|
| Boston†† | *$25.50* | *$25.00* | *$26.50* | *$25.50* | ..... | ..... |
| Brooklyn | *27.50* | ..... | ..... | *28.00* | ..... | ..... |
| Jersey City | *26.53* | *26.03* | *27.53* | *27.03* | ..... | ..... |
| Philadelphia (5) | *25.84* | *25.34* | *26.84* | *26.34* | *$30.74* | ..... |
| Bethlehem, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Everett, Mass. (3) | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Swedeland, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Steelton, Pa. | ..... | 24.50 | ..... | ..... | 29.50 | ..... |
| Birdsboro, Pa. (4) | 25.00 | 24.50 | 26.00 | 25.50 | 29.50 | ..... |
| Sparrows Point, Md. | 25.00 | 24.50 | ..... | ..... | ..... | ..... |
| Erie, Pa. | 24.00 | 23.50 | 25.00 | 24.50 | ..... | ..... |
| Neville Island, Pa. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Sharpsville, Pa. (1) | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Buffalo | 24.00 | 23.00 | 25.00 | 24.50 | 29.50 | ..... |
| Cincinnati, Ohio | *23.94* | *23.94* | ..... | *25.11* | ..... | ..... |
| Canton, Ohio | *25.39* | *24.89* | *25.89* | *25.39* | *32.69* | ..... |
| Mansfield, Ohio | *25.94* | *25.44* | *26.44* | *25.94* | *32.86* | ..... |
| St. Louis | *24.50* | *24.50* | ..... | ..... | ..... | ..... |
| Chicago | 24.00 | 23.50 | 24.50 | 24.00 | *35.46* | ..... |
| Granite City, Ill. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Cleveland | 24.00 | 23.50 | 24.50 | 24.00 | *32.42* | ..... |
| Hamilton, Ohio | 24.00 | 23.50 | ..... | 24.00 | ..... | ..... |
| Toledo | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Youngstown* | 24.00 | 23.50 | 24.50 | 24.00 | *32.42* | ..... |
| Detroit | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Lake Superior fc. | ..... | ..... | ..... | ..... | ..... | $34.00 |
| Lyles, Tenn. fc.†(2) | ..... | ..... | ..... | ..... | ..... | 33.00 |
| St. Paul | *26.76* | ..... | *27.26* | *26.76* | *39.80* | ..... |
| Duluth | 24.50 | 24.00 | 25.00 | 24.50 | ..... | ..... |
| Birmingham | 20.38 | 19.00 | 25.00 | ..... | ..... | ..... |
| Los Angeles | *26.95* | ..... | ..... | ..... | ..... | ..... |
| San Francisco | *26.95* | ..... | ..... | ..... | ..... | ..... |
| Seattle | *26.95* | ..... | ..... | ..... | ..... | ..... |
| Provo, Utah | 22.00 | 21.50 | ..... | ..... | ..... | ..... |
| Montreal | *27.50* | *27.50* | ..... | *28.00* | ..... | ..... |
| Toronto | *25.50* | *25.50* | ..... | *26.00* | ..... | ..... |

GRAY FORGE IRON: Valley or Pittsburgh furnace ..... $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

(2) Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

(3) Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $2 per gross ton above maximum prices.

(4) E. & G. Brooke Co. permitted to charge $1.00 per ton extra.

(5) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

PERFORATED METALS
INDUSTRIAL and ORNAMENTAL
To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

ANY METAL • ANY PERFORATION

The Harrington & King PERFORATING CO.

5657 FILLMORE STREET—CHICAGO 44, ILL.
Eastern Office, 114 Liberty Street, New York 6, N. Y.


## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

| | |
|---|---|
| Copper, electrolytic, 150 and 200 mesh | 21 ½ to 23 ½c. |
| Copper, reduced, 150 and 200 mesh | 20 ½ to 25 ½c. |
| Iron, commercial, 100 and 200 mesh | 13 ½ to 15c. |
| Iron, crushed, 200 mesh and finer | 4c. |
| Iron, hydrogen reduced, 300 mesh and finer | 63c. |
| Iron, electrolytic, unannealed, coarser than 300 mesh | 30 to 33c. |
| Iron, electrolytic, annealed minus 100 mesh | 42c. |
| Iron, carbonyl, 300 mesh and finer | 90c. |
| Aluminum, 100 and 200 mesh. | *23 to 27c. |
| Antimony, 100 mesh | 20.6c. |
| Cadmium, 100 mesh | $1 |
| Chromium, 150 mesh | $1.03 |
| Lead, 100, 200 & 300 mesh, | 11 ½ to 12 ½c. |
| Manganese, 150 mesh | 51c. |
| Nickel, 150 mesh | 51 ¼c. |
| Solder powder, 100 mesh, 8 ½c. plus metal | |
| Tin, 100 mesh | 58 ¾c. |
| Tungsten metal powder, 98%-99%, any quantity, per lb. | $2.60 |
| Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. | $2.60 |
| Under 100 lb. | $3.00 |

*Freight allowed east of Mississippi.

## BOILER TUBES

*Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.*

| | | Seamless Cold Drawn | Seamless Hot Rolled | Lap Weld. Hot Rolled |
|---|---|---|---|---|
| 2 | in. o.d. 13 B.W.G. | 15.03 | 13.04 | 12.33 |
| 2½ | in. o.d. 12 B.W.G. | 20 21 | 17.54 | 16.58 |
| 3 | in. o.d. 12 B.W.G. | 22.48 | 19.50 | 18.35 |
| 3½ | in. o.d. 11 B.W.G. | 28.37 | 24.62 | 23.15 |
| 4 | in. o.d. 10 B.W.G. | 35.20 | 30.54 | 28.66 |

*(Extras for less carload quantities)*

| | |
|---|---|
| 40,000 lb. or ft., and over | Base |
| 30,000 lb. or ft. to 39,999 lb. or ft. | 5% |
| 20,000 lb. or ft. to 29,999 lb. or ft. | 10% |
| 10,000 lb. or ft. to 19,999 lb. or ft. | 20% |
| 5,000 lb. or ft. to 9,999 lb. or ft. | 30% |
| 2,000 lb. or ft. to 4,999 lb. or ft. | 45% |
| Under 2,000 lb. or ft. | 65% |

## PRICES

### CAST IRON WATER PIPE

| | *Per Net Ton* |
|---|---|
| 6-in. and larger, del'd Chicago | $54.80 |
| 6-in. and larger, del'd New York | 52.20 |
| 6-in. and larger, Birmingham | 46.00 |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle | 71.20 |

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

### LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

| | *Per Gross Ton* |
|---|---|
| Old range, bessemer, 51.50 | $4.75 |
| Old range, non-bessemer, 51.50 | 4.60 |
| Mesaba, bessemer, 51.50 | 4.60 |
| Mesaba, non-bessemer, 51.50 | 4.45 |
| High phosphorus, 51.50 | 4.35 |

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

### COKE

***Furnace***

| | *Per Net Ton* |
|---|---|
| †Connellsville, prompt | $6.50* |

***Foundry***

| | |
|---|---|
| †Connellsville, prompt | 7.50 |
| Fayette County, W. Va. (Beehive) | 8.10 |
| By-product, Chicago | 12.30 |
| By-product, New England | 13.75 |
| By-product, Newark | 12.40 to 12.95 |
| By-product, Philadelphia | 12.38 |
| By-product, Cleveland | 12.30 |
| By-product, Cincinnati | 11.75 |
| By-product, Birmingham | 9.30† |
| By-product, St. Louis | 12.02 |
| By-product, Buffalo | 12.50 |

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

### FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

***Exception***

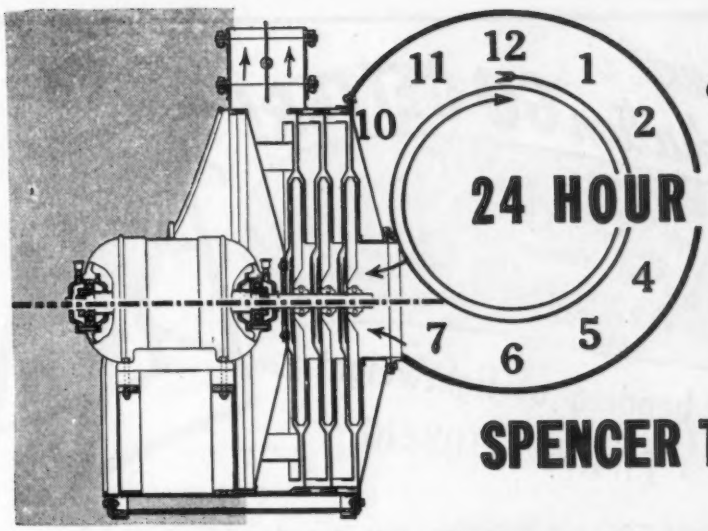
When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

| Effective $CaF_2$ Content: | *Base price per short ton* |
|---|---|
| 70% or more | $33.00 |
| 65% but less than 70% | 32.00 |
| 60% but less than 65% | 31.00 |
| Less than 60% | 30.00 |

### REFRACTORIES

(*F.o.b. Works*)

| ***Fire Clay Brick*** | *Per 1000* |
|---|---|
| Super-duty brick, St. Louis | $64.60 |
| First quality, Pa., Md., Ky., Mo., Ill. | 51.30 |
| First quality, New Jersey | 56.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 46.55 |
| Second quality, New Jersey | 51.00 |
| No. 1, Ohio | 43.00 |
| Ground fire clay, net ton | 7.60 |
| ***Silica Brick*** | |
| Pennsylvania and Birmingham | $51.30 |
| Chicago District | 58.30 |
| Silica cement, net ton (Eastern) | 9.00 |
| ***Chrome Brick*** | *Per Net Ton* |
| Standard, chemically bonded, Balt., Plymouth Meeting, Chester | $54.00 |
| ***Magnesite Brick*** | |
| Standard, Balt. and Chester | $76.00 |
| Chemically bonded, Baltimore | 65.00 |
| ***Grain Magnesite*** | |
| Domestic, f.o.b. Balt. and Chester in sacks (carloads) | $44.00 |
| Domestic, f.o.b. Chewelah, Wash. (in bulk) | 22.00 |


*It's a*

**24 HOUR SHIFT**

*again for*

**SPENCER TURBOS**

And Spencer Turbo-Compressors are standing the gaff just as they did in the last war, the post-war boom, and all emergencies during the past third of a century.

**SUGGESTIONS FOR ALL-OUT PERFORMANCE**

***Keep Them Well-Lubricated.*** It only takes a minute, and the bearings are the only parts that can wear.

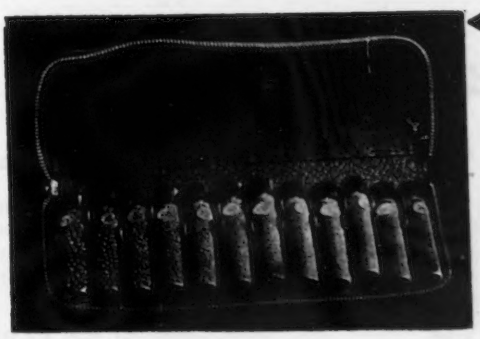
***Use Blast Gates.*** Even when rotating the Spencer uses little power when the blast gate is shut off.

***Get Acid Proof,*** gas tight, or overhung or outboard special models if you need them. The standard models are rust resisting throughout.

***Get the Spencer Data Book*** which shows how to figure to get more out of your air supply.

**THE SPENCER TURBINE COMPANY • HARTFORD 6, CONN.**

247A



HEAT-TREATED STEEL SHOT

**We manufacture shot and grit for endurance**

**A shot or grit that will blast fast with a clean finish.**

**This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.**

**The unprecedented demand for our—**

**Heat-Treated Steel Shot and Heat-Treated Steel Grit**

**has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.**

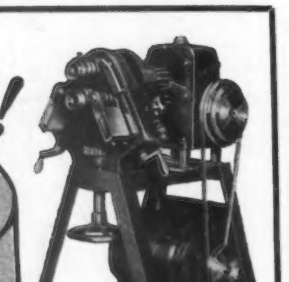
•

**HARRISON ABRASIVE CORPORATION**

**Manchester, New Hampshire**

HEAT-TREATED STEEL GRIT

# A real production GO GETTER!



for cold bending of lightweight

BARS • PIPING • TUBING

The exceptional speed, ease of control and versatility of the Buffalo "No. 00" Pinch-Type Bending Roll make it an ideal production tool on a wide variety of spiral and cylindrical bending operations. Difficult forms are readily handled. Since this machine works cold stock, preheating and retempering are eliminated. Overall construction is matched to heavy-duty service. Adjustments for each type of work can be quickly made. Full details in Bulletin 352-A. Write:

**BUFFALO FORGE COMPANY**

492 Broadway Buffalo, N. Y.

*Canadian Blower & Forge Co., Ltd., Kitchener, Ont.*

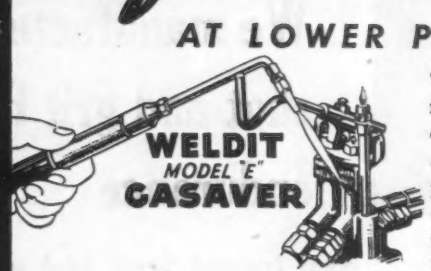
- RAPID OUTPUT
- ACCURATE
- EASY TO OPERATE
- QUICKLY ADJUSTED

"Buffalo" PINCH TYPE BENDING ROLLS



# Safe Welding

AT LOWER PRODUCTION COSTS




The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as *fifty* per cent. Prevents injury to workmen—or sudden fires—from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . *No readjusting required.* . . . Price $10.00 at Detroit. Order today.

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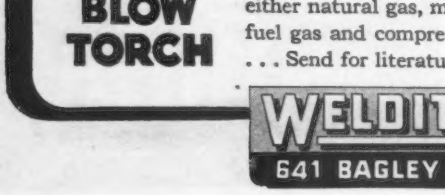

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MODEL "CW"
BLOW TORCH

The Weldit Model CW Blowpipe is in daily use by many foremost industrial plants. . . . Built in accordance with the recommendations of leading fabricators of sheet metal products. . . . Operates on either natural gas, manufactured gas, or other low temperature fuel gas and compressed air. Stands up under rough shop use. . . . Send for literature.

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641 BAGLEY AVENUE • DETROIT 26, MICH.


## PRICES

### *Ferromanganese*

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

| | |
|---|---|
| Carload lots (bulk) | $135.00 |
| Ton lots (packed) | 141.00 |
| Less ton lots (packed) | 148.50 |

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

### *Electrolytic Manganese*

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size 1" x D.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Carload lots | 37.60c. | 37.85c. | 38.15c. |
| l.c.l. lots | 39.60c. | 38.60c. | 40.65c. |

### *Spiegeleisen*

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

| | 16-19% Mn 1% max. Si | 19-21% Mn 1% max. Si | 26-28% Mn 1% max. Si |
|---|---|---|---|
| Carloads | $35.00 | $36.00 | $49.50 |
| Less ton* | 47.50 | 48.50 | 62.00 |

### *Electric Ferrosilicon*

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 50% silicon | 6.65c. | 7.10c. | 7.25c. |
| 75% silicon | 8.05c. | 8.20c. | 8.75c. |

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

### *Silvery Iron*

(*Per Gross Ton, base 6.00 to 6.50 Si*)

| | |
|---|---|
| F.o.b. Jackson, Ohio | $29.50* |
| Buffalo | 30.75* |

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

### *Bessemer Ferrosilicon*

Prices are $1 a ton above silvery iron quotations of comparable analysis.

### *Silicon Metal*

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 96% Si, 2% Fe. | 13.10c. | 13.55c. | 16.50c. |
| 97% Si, 1% Fe. | 13.45c. | 13.90c. | 16.80c. |

### *Ferrosilicon Briquets*

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Car lots | 3.35c. | 3.50c. | 3.65c. |

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

### *Silicomanganese*

(*Per gross ton, delivered, carloads, bulk*)

| | |
|---|---|
| 3.00 carbon | $120.00* |
| 2.50 carbon | 125.00* |
| 2.00 carbon | 130.00* |
| 1.00 carbon | 140.00* |
| Briquets, contract, basis carlots, bulk freight allowed, per lb. | 5.80c.† |
| Packed | 6.05c.† |
| Less ton lots | 6.55c.† |

*Spot prices are $5 per ton higher.
†Spot prices ¼c. higher.

### *Ferrochrome*

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per lb. of contained Cr, lump size in carlots, f.o.b. shipping point, freight allowed to destination.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 0.03% carbon | 25.00c. | 25.40c. | 26.00c. |
| 0.06% carbon | 23.00c. | 23.40c. | 24.00c. |
| 0.10% carbon | 22.50c. | 22.90c. | 23.50c. |
| 1.00% carbon | 20.50c. | 20.90c. | 21.50c. |
| 2.00% carbon | 19.50c. | 19.90c. | 20.50c. |

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

## PRICES

### *Other Ferroalloys*

| | |
|---|---|
| Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. producer's plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten. 10,000 lb. or more | $1.90 |
| Ferrovanadium, 30-35%, contract basis, f.o.b. producer's plant, usual freight allowances, any quantity, per lb. contained vanadium. | |
| Open Hearth | $2.70 |
| Crucible | $2.80 |
| Primos | $2.90 |
| Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal | $1.50 |
| Vanadium pentoxide, 88%-92% $V_2O_5$ technical grade, contract basis, any quantity, per lb. contained $V_2O_5$ | $1.10 |
| Ferroboron, contract basis, 17.50% boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy | $1.20 |
| Ton lots | $1.25 |
| Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy | 23c. |
| Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy | 40c. |
| Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb. | 45c. |
| Bortam, f.o.b. Niagara Falls | |
| Ton lots, per lb. | 45c. |
| Less ton lots, per lb. | 50c. |
| Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per lb. contained boron | $7.00 |
| Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium | $2.25 |
| Less ton lots | $2.30 |
| Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium | $1.23 |
| Less ton lots | $1.25 |
| Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium | $1.35 |
| Less ton lots | $1.40 |
| High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per gross ton | $142.50 |
| 3%-5% carbon | $157.50 |
| Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equaled with Rockdale, Tenn., per gross ton | $58.50 |
| Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton | $75.00 |
| Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum | 95c. |
| Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum | 80c. |
| Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo | 80c. |
| Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb contained Mo | 80c. |
| Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy | 15c. |
| Less ton lots | 16c. |
| Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton | $102.50 |
| Packed | $107.50 |
| Less ton lots | $112.50 |
| Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb. | 7.50c. |
| Ton lots | 8c. |
| Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb. | |
| Car lots | 9.50c. |
| Ton lots | 10.00c. |
| Less ton lots | 10.50c. |


*How to select* **Electric Hoists** *to meet your needs . . .*

To find out how the READING UNIT CONSTRUCTION PLAN can be put to work in YOUR plant ask for a copy of "Modern Materials Handling Magic". This 16-page booklet can do a lot to help you boost output and simplify hoist maintenance.

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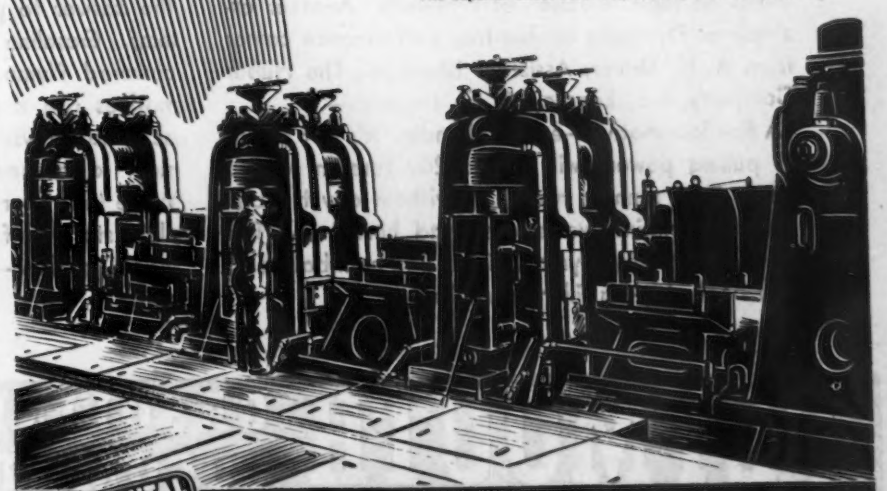

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